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Treatment of Difficult and Involved Colles' Fractures

FRANCIS J. COX, M.D., and AUGUST W. MEIER, M.D., San Francisco

SUMMARY

Of 105 cases of Colles' fracture, 86 were treated by closed reduction and plaster immobilization alone; 19 cases in which the fractures were more severe were treated by fixed skeletal traction using an external skeletal traction splint.

Despite the greater severity of the lesions, the end results, both anatomic and functional, were generally better in those cases in which skeletal traction was used than in those treated by closed reduction.

FRACTURES of the distal end of the radius which cause comminution and impaction of the fragment of the radius are the only true Colles' fractures.⁵ As cancellous bone must be present for this to occur, true Colles' fracture never occurs in persons under 20 years of age. In most cases in which persons in the second and third decades of life receive a fracture in a fall on an outstretched hand, the break is in the carpal scaphoid rather than in the radius at the wrist. Most Colles' fractures occur in persons over 40 years of age; the incidence is higher in persons over 50 years of age.

In a Colles' fracture there must be an element of impaction or compression of fragile cancellous bone. After the impaction is broken up and the fragments are pulled out into proper alignment, a dead space remains (Figure 1), caused by the compression of the elements of cancellous bone in that area. This

dead space must fill in with blood clot and new bone before healing of the fracture occurs. If the impaction is severe or comminution exists, it becomes exceedingly difficult to maintain length and alignment of the radius while the dead space is filling in with new bone. For this reason, in many cases Colles' fracture is complicated by loss of position following reduction, shortening of the radius, a radial shift of the carpus, and distortion in the normal relationship of the radius and ulna in the distal radio-ulnar joint. This fact accounts for the permanent residual deformity and disability so common after a severe Colles' fracture; the patients have limited mobility in the wrist joint, and almost all of them have pain at the distal radio-ulnar joint. Several reconstructive surgical procedures have been developed to overcome this disability. Campbell⁴ advised osteotomy of the radius with a bone graft inserted to restore length and proper alignment of the radius



Figure 1.—Severe Colles' fracture in traction. Note area of dead space which must fill in with new bone to maintain length.

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with the carpus. Darrach⁶ advised resection of the distal end of the ulna so as to allow for restoration of normal pronation and supination, and to obviate pain in the distal radio-ulnar joint. The authors felt that if length and alignment of the radius could be maintained by fixed skeletal traction while the dead space was being obliterated with new bone formation, the development of deformity could be prevented and the necessity for reconstructive surgical procedure avoided.

One hundred thirty-nine patients with Colles' fracture were treated at the San Francisco Hospital; 105 were followed up for at least six months, and the end results were studied and evaluated. In the other 34 cases follow-up was inadequate.

Closed reduction with plaster immobilization was carried out in 86 cases. The number of patients in

each age group, by decades, was as follows: Third decade, 5; fourth, 14; fifth, 15; sixth, 21; seventh, 10; eighth, 17; ninth, 5. In the majority of cases sodium pentothal was used for anesthesia during reduction and a plaster of paris cast extending from the proximal palmar crease to above the elbow was applied for immobilization. The forearm was held in moderate pronation at about 15 to 20 degrees of flexion and 20 to 25 degrees of ulnar deviation. When the reduction was accomplished and the cast applied, the forearm was held in a position of pronation before the wrist was flexed and placed in ulnar deviation. This is an important point because of the fact that the procedure placed the hand in such a position that full finger motion was made possible.

The detail of moulding the plaster to hold the carpus tightly against the ulna is important. The cast must be cut back far enough into the palm to allow for 90 degrees of motion in the metacarpophalangeal joints. If this much finger motion is possible, there is no chance for fixation of the flexor and extensor tendons at the site of fracture. As a consequence, there is no difficulty in restoring wrist movement even though a fracture has been held for as long as eight to 12 weeks in plaster.

In evaluating anatomic and functional end results, the following system of grading was adopted: 0 for failure; 1 for 25 per cent of normal; 2 for 50 per cent of normal; 3 for 75 per cent of normal, and 4 for normal.

Anatomic results were as follows: in 26 cases, 0; in two cases, 1; in 11 cases, 2; in 26 cases, 3; in 21 cases, 4.

Functional results: in one case, 1; in seven cases, 2; in 37 cases, 3; in 41 cases, 4. Most of these patients had a satisfactory wrist joint even though some of the anatomical position was lost due to resorption and shortening in plaster.



Figure 2.—End result following resection of the distal end of the ulna according to the method of Darrach. The distal radio-ulnar joint is eliminated and pronation and supination are restored.



Figure 3.—Substitution of pseudoarthrosis in the shaft of the ulna to compensate for the loss of movement in the distal radio-ulnar joint. Main indication where shortening of the radius is not excessive.

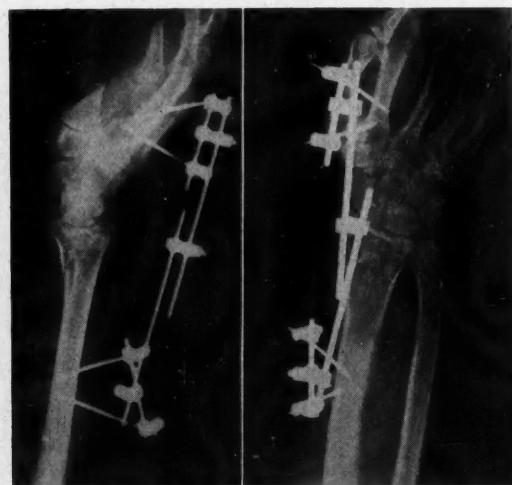


Figure 4.—First half pin unit placed through the shaft of the second metacarpal, and the second half pin unit placed in the shaft of the radius proximal to the fracture. The closed reduction is maintained by the external fixation bar.



Figure 5.—Case 1. Note severity of comminution of the radius with compression of the cancellous bone. Dead space created.



Figure 6.—Case 1. End result, one year, shows healing with fair preservation of length. Dorsal tilt, distal end of the radius 20 degrees. Distortion of the distal radio-ulnar joint caused by shortening of the radius. Anatomical result considered 50 per cent of normal. Functional result is excellent. Three years later the patient was doing heavy manual labor.



Figure 7.—(Left): Case 2. Note, severe comminution, shortening, and radial shift, but no fracture of the ulna. (Right): Lateral projection, showing a free segment of radius lying over the metacarpal shaft in subcutaneous region.

In three of the cases in which closed reduction was carried out there was so much deformity that reconstructive surgical procedure was necessary to provide a satisfactory wrist. Two of the patients had resection of the distal end of the ulna (Figure 2). The third had a cuff resection of a portion of the ulna, an operation described by Sauve and Kapandji¹² (Figure 3). This latter procedure is a very useful one if the degree of shortening of the radial fragment is not excessive, because it does eliminate the factor of pain in the distal radio-ulnar joint without causing cosmetic deformity of the wrist joint proper.

DIFFICULT AND INVOLVED COLLES' FRACTURES

In 19 cases there was extensive comminution of the distal end of the radius. From previous experience it was felt that any attempt to hold these fractures by closed means alone could only result in severe, crippling deformities that would necessitate major surgical intervention later. Therefore the patients were operated upon shortly after injury and a fixed skeletal traction apparatus was applied. The apparatus used was made up of the dental elements of an external Roger Anderson¹ fixation splint (Figure 4). At first the method was used only in extreme cases, but the results obtained were so satisfactory that the number of patients so treated was increased as time went on. The authors wish to emphasize the need for traction in all cases of comminuted Smith fracture (reverse Colles').

The operative procedure demands the same care and preparation as that required for any major orthopedic operation. The splint is applied with strict aseptic precautions under general anesthesia in an operating room. Two pins are obliquely placed through the shaft of the second metacarpal, and two pins are placed obliquely through the bare area on the shaft of the radius proximal to the site of fracture. The apparatus is adjusted and a closed reduction done. The apparatus is tightened while the reduction is being maintained manually. X-ray films are obtained immediately and if any adjustment of position of the fracture fragments is necessary it is done at that time. Adequate length in the antero-posterior projection is mandatory. In the lateral projection, a vertical position of the articular surface of the radius is accepted because it has been found impossible to rotate a mass of comminuted fragments of bone into a position of volar angulation. The pinholes are carefully dressed and the whole apparatus covered with sterile sheet wadding. Because there is movement of the skin near the proximal pin, a plaster covering extending above the elbow is applied in order to obviate irritation at that site and the possibility of pin tract infection.

At the end of three weeks the original cast is removed and replaced by a forearm covering of plaster. This is worn until such time as x-ray studies show evidence of adequate bone union at the site of fracture. If the union is precarious, the splint should be left in place for as long as eight to ten weeks'

time. Premature removal of the splint can result in prompt loss of position of fragments. Full function of the hand, elbow, and shoulder is maintained at all times.

Despite the severity of the 19 cases treated by fixed skeletal traction, the results, anatomic and functional, were better in this group than they were in the group in which closed reduction alone was used.

The grades for anatomic results were: in two cases, 2; in 13 cases, 3; in four cases, 4. Functional results were: in nine cases, 3; in ten cases, 4.

Physiological age and economic need are the main factors taken into consideration in choosing patients to be treated by this method. The main aim has been to prevent deformity in patients who have a moderate life expectancy and who must return to some form of productive work. Sixteen of the 19 patients were less than 60 years of age.

CASE REPORTS

CASE 1: The patient, a man 60 years of age, had sustained a severe comminuted Colles' fracture of the left wrist (Figure 5). Two days later closed reduction was carried out and a fixed skeletal splint applied (Figure 1). A long arm cast was used for three weeks and a short arm cast for another month. The fixation pins then were removed and a short arm cast was continued for an additional four weeks. The end result is shown in Figure 6.

CASE 2: A woman 27 years of age entered San Francisco Hospital with multiple fractures received in a fall from a considerable height. The distal shaft of the left radius was severely comminuted (Figure 7, left). A loose fragment of the radius which measured about 2 cm. in length was found lying subcutaneously near the base of the metacarpal bones (Figure 7, right). An external skeletal splint was applied



Figure 8.—Case 2. End result, seven months. Solid healing of fracture. Note slight radial shift persisting. Anatomical result rated 75 per cent of normal. Functional result excellent except for loss of 50 per cent supination.

and a closed reduction of a fracture of the wrist was carried out. The free fragment of radius was excised. Skeletal traction was continued for seven weeks and a short arm plaster cast was used for another six weeks. The end result, seven months after injury, is shown in Figure 8.

CASE 3: A 49-year-old man had a severe comminuted fracture of the distal end of the left radius (Figure 9). An external skeletal fixation splint was applied on the date of injury in the usual manner. This was worn for six weeks, and a short arm plaster cast was worn for an additional four weeks. The patient was able to return to his regular work as a fireman, without disability, three and a half months after the injury occurred. The end result is shown in Figure 10.

CASE 4: A 62-year-old housewife had an extremely severe comminuted fracture of the radius and the ulna (Figure 11). There was an excessive amount of soft tissue swelling. An

attempt at closed reduction was made and the arm was elevated until the swelling subsided. As it was felt that satisfactory position could not be maintained, an external skeletal fixation splint was applied and the fracture of the radius was



Figure 9.—Case 3. Note, severe comminution of the radius with shortening and carpal shift. No fracture of the ulna.



Figure 11.—Case 4. Note, extreme comminution of both the radius and ulna: A completely unstable fracture.



Figure 10.—Case 3. End result, nine months. Anterior-posterior, excellent alignment. Almost normal relationship of the distal radio-ulnar joint. Lateral projection, slight dorsal tilt of the articular surface of the radius. Full work capacity as a fireman.

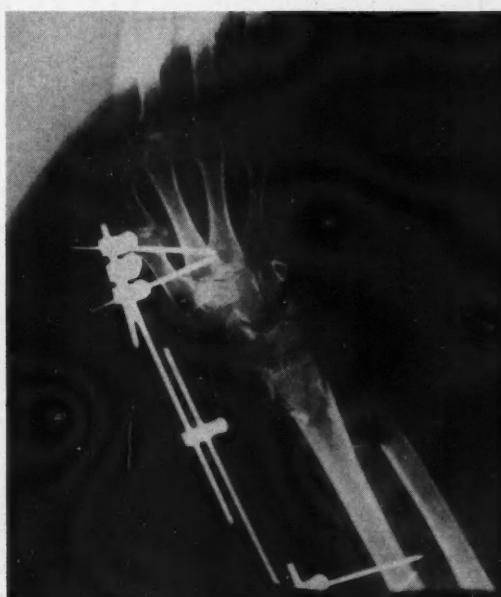


Figure 12.—Case 4. Primary resection of the distal end of the ulna.

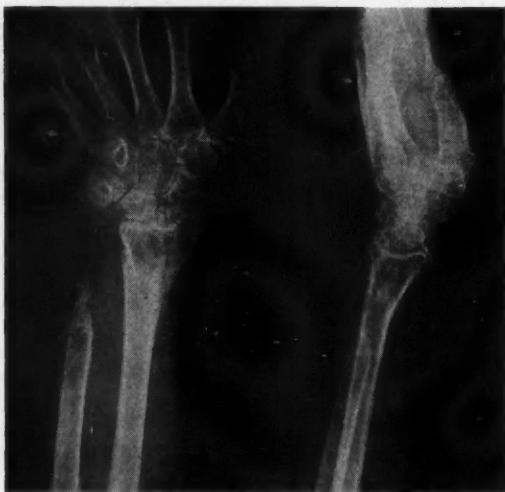


Figure 13.—End result, nine months later. Excellent alignment and length of the radius. Normal function except for a 25 per cent loss of the ability to grip.

reduced by closed means. The alignment of the radius then was considered quite satisfactory. The fragment of the ulna could not be kept in adequate position and, furthermore, trouble was anticipated because of gross disturbance at the distal radio-ulnar joint. Therefore, primary resection of the fragment of the ulna was done (Figure 12) two weeks after the skeletal splint was applied. The operative wound healed without incident. The skeletal traction was maintained for another two months, and a short forearm cast was worn for an additional four weeks. When last observed, seven months

later, the patient had normal range of motion in the wrist and, except for slight weakness in gripping power, there was no residual disability (Figure 13).

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Immunization with Influenza Virus Vaccines

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SUMMARY

Routine immunization against virus influenza is not recommended at this time because of the appearance of new strains not included in present-day vaccines. As more strains of the virus are included in this vaccine, its efficiency is being improved. Vaccination of adults and children is discussed. Final judgment must await further laboratory and clinical investigation.

ACTIVE immunization against viral influenza does not have the support of a majority of clinicians today, for two principal reasons. First, there is little or no cross-immunity between different strains of the virus and new strains are appearing from time to time which are not affected by commercially available vaccines. Second, in a large majority of cases the disease lasts only two to four days and patients recover rapidly with few complications. However, it should not be overlooked that influenza is still the seventh leading cause of death in the United States.¹² What effect the new antibiotics will have in control of this disease is not apparent at present.

Modern knowledge of the influenzal group of viruses began with the isolation of Influenza A from the throat washings of patients by Smith, Andrewes, and Laidlaw in England in 1933.²¹ These investigators also proved that neutralizing antibodies against the virus developed during convalescence from influenza.³

The initial discovery of the influenza virus was confirmed by Francis⁷ in 1934, and with the aid of an accurate neutralization test in 1935 he was able to show that British W.S. strain, the Puerto Rican PR8 strain and the Philadelphia strain were immunologically similar.⁸ In 1935 Smith, Andrewes and Laidlaw²² reported that ferrets and mice could be infected only by way of the respiratory tract and not by injection, and this fact laid the groundwork for the first successful vaccination of mice by Francis and Magill.¹⁰ The studies of Burnet⁵ (1935), showing that influenza virus could be adapted to grow on the chorioallantoic membrane of hens' eggs, made possible the commercial production of influenzal vaccines in large quantities.

In 1936 Smith²⁰ developed a complement fixation test for the determination of antibodies. During the

period from 1936 to 1940 numerous vaccines were developed against influenza, but none were sufficiently concentrated to induce satisfactory immunity. In 1940, Francis⁹ and Magill,¹⁵ working independently, recovered a new virus which was named Influenza B. Then, in 1941, Hirst¹⁴ revolutionized laboratory studies of the influenza virus with the introduction of a red blood cell agglutination test for the rapid identification of the different strains of the influenza virus.

In 1943 the Army Commission on Influenza,⁶ using a concentrated mixed vaccine prepared by Francis and Salk, and containing the PR8 and Weiss strains of A virus and the Lee strain of B virus, began the vaccination of controlled groups. A well controlled experiment was conducted in the Army Student Training Program units in nine university centers. Between October 19 and December 4 in 1943 a total of 6,263 students were vaccinated with a single dose of 1 cc. of a formalized allantoic fluid eluate, Type A and B, 10 times concentrated, containing the previously mentioned three strains—two of A and one of B. At the same time, 6,211 comparable alternate controls were injected with a similar material but containing no virus vaccine. Epidemics of Influenza A developed at all of these institutions in late November and early December, and the incidence of influenza in the vaccinated group was 2.22 per cent and in the control group it was 7.11 per cent. Expressed in another way, 76.2 per cent of all cases occurred in the control group. Similar but even more striking results were obtained in another study during an epidemic of Influenza B at Michigan, Yale and Alabama universities in 1945. Using approximately 1,000 vaccinated students and 2,000 controls, the incidence of Influenza B was as follows: In the vaccinated group, 1.15 per cent; in the control group, 9.91 per cent.

After these encouraging results, the pendulum began to swing the other way and clinical experiments were reported by Smadel¹⁹ in 1947, Van Ravenswaay²³ in 1948, and Sigel¹⁸ and co-workers in 1948. They carried out well controlled vaccination studies, but little or no reduction of the influenza attack rate was noted in the vaccinated groups. It was then shown that new strains of the Influenza A and B viruses were culpable and although the vaccinated persons could be shown to have high and presumably protective blood titres of antibody against the strain used in preparation of the vaccine, there was no evidence of cross-immunity against the new strains. In 1949 Andrewes¹ pointed out that almost all the Influenza A outbreaks since 1947 were associated with the apparently novel A-prime strains. The older W.S. and PR8 strains seem to

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have become practically dormant, yet all the commercially available mixed influenza virus vaccines on the market today contain the PR8 strain.

Consideration of certain characteristics of the influenza virus may be of help to a better understanding of the problems of preparing a successful vaccine. The influenza virus does not commonly invade the blood stream as do the viruses of measles and yellow fever, for example, which tend to produce life-long immunity. Influenza is characterized by symptoms that are predominantly constitutional—namely, chills, fever, headache, malaise, and muscular aches and pains—although the infection itself is limited to the respiratory tract. Henle and Henle¹³ in 1946 showed that the influenza virus has a toxin-like action demonstrable in mice and rabbits. Andrewes² pointed out that it may be possible by minimal treatment with ultraviolet irradiation to destroy infectivity while retaining some toxicity. He also suggested the interesting theory that because the influenza virus can attack through the exposed surface of mucous membranes and does not have to run the gauntlet of the antibodies and leukocytes in the blood, a subject may be completely vulnerable even a short time after a previous infection.

Considerable attention has been directed in the past few years to the problem of immunizing children with influenza virus vaccines. Francis and Magill¹¹ and Rickard and Horsfall found that the serum of the newborn infant has about the same antibody titre as that of its mother. This titre falls rapidly after the first month of life until the infant is one to two years of age. Then it begins to rise again, reaching a maximum after 20 years of age. In a study by Peterman and Kores,¹⁶ a majority of children in the series (including 16 under two years of age) had at least a fourfold increase in the amount of serum antibodies following intracutaneous injection of influenza vaccine. It was noted also that the incidence of systemic reactions in children was much less when the vaccine was administered intracutaneously than it was when the subcutaneous route was used. These findings agreed with those of Bruyn, Meiklejohn and Brainerd,⁴ who concluded that intracutaneous inoculation is the method of choice for children.

As the incidence of influenza usually reaches its peak in December and January, and as the immunity produced by present-day commercially available vaccines can be expected to protect a majority of vaccinated individuals against the strains included in the vaccine for a period of four to five months, the logical time of the year for vaccination would appear to be in October. Full development of immunity requires a period of two to four weeks. Influenza virus vaccines Types A and B should be used for immunization rather than either type alone.

The adult immunizing dose is a single cubic centimeter injected subcutaneously. A suggested schedule for children is two doses of 0.1 cc. each, given intracutaneously three days apart.⁴

All the commercial vaccines today are prepared from the allantoic fluid of infected chick embryos,

and persons who are hypersensitive to egg should be skin tested before immunization. Final judgment concerning the efficacy of influenzal vaccination must await further research in the laboratory and in the field.

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The Concept of Continuation Education in Medicine

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SUMMARY

The rapid increase in quantity and complexity of medical knowledge requires a redefinition of the educational aims of schools of medicine. The four formal years in medical school must be regarded as only the first four years of a "forty-year medical educational experience" and these four years must be devoted in the main to teaching principles of health and disease. There, then, must follow well-planned, realistic programs of continuation education, not in lieu of, but in addition to already established formal programs of postgraduate education.

MEDICAL education beyond graduation from medical school is often unorganized and in some instances as unrealistic as undergraduate medical education was 50 years ago. Shortly after the turn of the century, leaders in the medical profession took cognizance of the fact that medical knowledge had clearly outstripped educational techniques, and from their concern grew the now famous Flexner survey and report. This effort focused a spotlight on our educational weaknesses, and drastic steps were taken to modify the activities of the schools to the demands and needs of the time. We have seen the development of the four-year medical school with an organized curriculum designed to integrate the medical sciences with their clinical application. Whatever be the errors and omissions of our present undergraduate medical educational pattern, and there are certainly some, the fact remains that the modern American medical school is delivering to the American public a practitioner whose increased skill has effectively paralleled advances in medical knowledge and who, in my opinion, stands well in the forefront of his fellow practitioners over the globe. I would like to emphasize that the remarkable increases in longevity and reductions in death rates in many diseases are not due entirely to the x-ray, antibiotics, and all of the other effective tools which have come from the productive research laboratories. I believe the crucial fact to be that these tools were handed by the research scientist to the practicing physician whose basic education has been so sound that he has been able to translate the effectiveness of these tools into immediate benefits for the public.

Medical science and medical knowledge continue to expand at a rate that astonishes even the medical profession. Who would have thought 20 years ago

that today we would be operating with relative impunity on the heart itself? What vistas will the diagnostic and therapeutic application of the products of atomic energy open? It seems clear to many of us in medical education that the function of the school of medicine and its undergraduate curriculum must be redefined in terms of the needs of the middle of the twentieth century. The medical schools certainly cannot be all things to all people and I believe we are fooling ourselves if we think that the conventional four-year curriculum will result in a "compleat" physician. It is my opinion that we must now think of the "forty-year educational experience," only the first four years of which are spent in continuous residence in the school of medicine. These first four years must be designed to provide the physician with a basic foundation—principles, if you will—on which he may continue to build during the remainder of his professional life. I am much more interested in seeing that a medical student understand the basic action of a particular drug than that he be familiar with which drug company sells what brand. If the student has the idea that he has only four years in which to learn all of the things that will make him a finished physician, he is inevitably going to seek practicality at the expense of a firm and strong scientific foundation. If, on the other hand, he can be indoctrinated with the idea of continuing medical education, it will be much easier for him to understand the need for basic physiology, pharmacology, biochemistry, etc.

The expansion and increasing complexities of medical knowledge associated with the increasing demands for more and better medical service on the part of the American public make for a situation which cannot be resolved by occasional medical meetings or any number of medical journals. Those concerned with medical education must construct realistic, organized programs of high quality designed to satisfy the desire of the practitioner to maintain his professional excellence and designed to cover all types of practitioners of medicine no matter where they are located. As I conceive it, then, continuation education in medicine implies (1) the indoctrination of the medical student with the 40-year educational concept so that there is a high sense of obligation on his part to participate in continuing education and (2) the development of organized programs designed to effectively answer the needs of the practitioner.

The greatest impetus for training programs in medicine beyond the internship has been the development of the various American boards in the many specialty fields. There is no question that the enlightened and vigorous activities of these boards has led to a higher standard of medical practice. Certainly at a time when the schools of medicine were, in my opinion, defaulting on their respon-

Dean of the University of Kansas School of Medicine.
Guest speaker's address delivered before the First General Meeting of the 79th Annual Session of the California Medical Association, April 30-May 3, 1950, San Diego.

sibilities in postgraduate education, the development of the board certifying group represented the major active effort in recognizing the educational needs of an expanding medical knowledge. Without in any sense wishing to minimize the contributions to medical education and medical practice made by the American boards, I must express my concern about certain aspects of these programs. In the first place, and this perhaps was to be expected, all too often do we now see young men to whom board certification is no longer the means to the end of greater ability but rather the end itself. Too many students today are more concerned over whether or not a certain program will lead to board certification than whether the program provides them with the skills which they will require in their own practice. Although I recognize the need for accreditation as a principle, I am also greatly worried lest the tyranny of fixed programs based upon the formula of accrediting bodies devitalize and make less dynamic the program itself.

My second concern is based upon the firm conviction that the academic formula is of little value unless it maintains its touch with reality. As educators we dare not let ourselves become dissociated from the needs of the public. It is stated that between 70 and 80 per cent of the medical care provided in this country is delivered by the man in general practice; and yet, exclusive of the internship, probably 70 to 80 per cent of the postgraduate effort until recently has been focused upon the specialist. Surely such pronounced dislocation of teaching effort and the realities of practice is wrong. What, then, can be done to correct this disproportion and thereby devote to the man who takes care of 80 per cent of the ills of the nation the appropriate amount of graduate teaching time?

The guiding principle in answer to this question, I believe, is that two wrongs do not make a right. That is to say, we dare not reduce the quality and effectiveness of our resident teaching in the specialties. Highly skilled specialists of many types will continue to be needed and resident training programs for the physician who has chosen this future should continue to be strengthened and improved in quality. However, there must now be added to our postgraduate effort effective, well-organized and well-designed curricula for the person who has been called the quarterback of the medical team, namely the family practitioner. The general practitioners themselves have realized this and it is to their great credit that their national organization requires, for continuing membership, evidence of organized postgraduate study at stated intervals. It is the only such organization in medicine which to my knowledge has officially recognized the necessity of continuing education.

Postgraduate programs for the physician in family or general practice are in existence in many parts of the country and are of many types. However, in order to focus my remarks more sharply, I would like to describe briefly the concept of continuation education which we have been develop-

ing in Kansas for the past several years, and a program which appears to us to be workable and realistic. We realize, of course, that there are still certain deficiencies which need time, experience, and funds for correction. I should point out that the program to be described is in addition to resident training programs in the specialties, for we also recognize our obligation to continue to provide for our area skilled practitioners in the special branches of medicine.

At the outset let me note that ours is a combined effort. The basic decisions are made annually by a committee whose membership consists of representatives from the University of Kansas School of Medicine, the Kansas Medical Society, and the Kansas State Board of Health. This committee determines the general subjects to be covered each year in the various parts of the program and provides an excellent mechanism for determining the needs and desires of the practitioner of medicine in our general area. Administrative leadership is provided by the medical school through the combined efforts of the extension division of the University and the department of postgraduate medicine of the Medical School. There are three general types of programs now in operation.

The first of these is the so-called three- to four-day refresher course. These courses are held monthly or oftener at the School of Medicine in Kansas City. The content of each course is concerned with one particular field of medicine, such as surgery, obstetrics and gynecology, or internal medicine. The faculty for these courses consists of three types of persons: (1) Two or three experts in the particular field to be covered, drawn from various parts of the country, (2) members of our own medical school faculty, and (3) two or three practitioners from within our own state who are particularly qualified. This latter group has been found to be very valuable in leavening the content of the program. The faculty for each program is chosen by the chairman of the appropriate department in the medical school. The departmental chairman also has the obligation of suggesting specific topics in the program so there is a certain logical thread of continuity through it. Abstracts of all of the papers given are submitted to the department of postgraduate medicine well in advance of the course so that each registrant at the course receives on the first day of the program a bound copy of all of the material to be presented. Fees for these refresher courses range from \$15 to \$25 per course. No fee is charged the intern or resident. It should be noted at this point, that recognizing that medical service today represents the combined efforts of a team of experts, we also carry on refresher courses for such persons as public health officers, medical technicians, nurses, hospital dietitians, and hospital administrators. These courses are open to all qualified persons whether they reside in the state or not.

A modification of the courses held at the medical school are the so-called continuation courses which represent a full day's program each week for six to

eight weeks. They are held in such fields as roentgenological physics, surgical pathology, and heart and circulation. The faculty for these courses is picked much as is the faculty for the previously mentioned four-day refresher courses. The guest lecturers receive reasonable compensation as well as their expenses.

The second basic type of continuation study is the so-called circuit course program. Eight communities in the state of Kansas picked for their strategic geographical location have been designated as circuit course centers and these are divided into two circuits of four towns each. Monthly a team of two physicians, usually one member chosen from our faculty and one member a skilled practitioner of medicine in our state, go out on this circuit, appearing in each of the four towns on the circuit on consecutive days. The meetings usually consist of an afternoon session, dinner, and an evening session. At the same time that one team is traveling one circuit, another team of two physicians is appearing on the second circuit. The teams shift to the opposite circuit the following month. In the third month two new teams of physicians go out on the circuits, and on the fourth month they also shift. The circuit courses at present cover six months of the year. The material chosen to be covered in these courses is specific in nature, such as "Modern Advances in the Treatment of Diabetes" and "Office Procedures in Urology." Great emphasis is laid upon the use of visual education (sound movies, slides, etc.). It is extremely important that the student-physician's time not be wasted and this can be accomplished, in our experience, only with prepared material. As in the refresher courses, bound copies of abstracts of the talks on the circuit courses are made available to the registrants. The fee for the circuit course averages in the neighborhood of \$25 for the full series of six programs. The circuit course program has become one of the most popular efforts of the medical school, and each year there has been a substantial growth in the number of registrants and in the enthusiasm of physicians for it. One interesting by-product has been that a number of county medical societies have planned their business meetings on the morning of the day of the circuit course and have utilized the circuit course program for their scientific county society meeting.

The third main continuation effort is barely under way in our institution, but to many of us it appears to be the most important in many respects. This, for want of a better term, we have called "in-residence" training for the man in general practice. It implies a period of residence in the medical school of not less than four weeks and up to a full year. It is designed to provide organized training in one or more branches of medicine for the young man who has entered general practice after not more than a two-year rotating internship. For example, a physician doing general practice in association with one or more colleagues may find that he is being asked to do more and more of the diagnostic radiologic studies. If he is to do justice

to his obligation he must have something more than easy consultant access to a qualified radiologist; he must have the opportunity to sharpen certain skills in this field. Regardless of sincere claims as to the undesirability of a man doing diagnostic x-ray work without a three-year residency, the realities of the situation are that a great amount of diagnostic radiology is being done by just such persons. It is my contention that we must take cognizance of such realities and try to provide limited organized training. Of course, one must be certain that such a program does not interfere with the already existent resident training schedules.

We have asked our departmental chairmen to design suitable programs within their various departments, and they are the ones who determine how many student-physicians may be in-residence in their particular department at any one time and the length and character of the program. The only thing that the dean's office asks is that the curricula provide a good measure of what we have called "laying on of the hands" training. The fees scheduled are \$50 per month for residents of the state of Kansas and \$100 for the non-residents. The basic limitation for the expansion of such a program is obviously the size of the physical facility and the available teaching staff.

It must be evident that programs of the type described require considerable personnel as well as financing if they are to be truly effective. We have been able to finance the main part of our effort through a specially designated state appropriation supplemented by fees collected for the various courses. In rare instances small subsidies from certain organizations have been available. However, one should be realistic about the abilities of a medical school to suddenly take on a substantial postgraduate obligation. Most schools today are stretched to the limit of their capacities and many are having basic financial difficulties. To add an extensive program of postgraduate medicine in some instances will nearly double the teaching obligations of an institution, for the basic undergraduate program must not be compromised. We are by no means satisfied with our present system of continuation education, but improvement will depend on additional funds, and the costs may be largely hidden for they will be represented by additions to the full-time faculty of the school of medicine.

Recognizing this problem, some medical schools have purposely divorced the postgraduate effort from the undergraduate school and have organized special postgraduate schools of medicine. This concept has merit but I personally should prefer to keep the whole program under one roof for purposes of coordination and avoidance of duplication. However, boards of trustees and state legislatures must be led to understand very clearly that the increased costs attendant on such a program do not represent increased expense of undergraduate medical education but reflect a necessary extension of the overall educational program of the school.

The Medical Center.

Hysterectomy—Total or Subtotal for Benign Lesions

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SUMMARY

With careful use of a suggested technique for total hysterectomy which has been developed and used over a period of 20 years, the mortality rate associated with the operation need be no greater than that for subtotal hysterectomy. Moreover, the results obtained with it overcome many of the objections which advocates of subtotal hysterectomy raise against the routine use of the more extensive operation. At the same time none of the advantages of total hysterectomy are surrendered.

FOR many years there has been a pronounced difference of opinion in the medical profession with regard to the type of hysterectomy which should be done for benign lesions of the pelvis. The great majority of gynecologists who have written on the subject in the last 20 years favor the total operation whenever it is feasible. A small minority believe that the routine use of total hysterectomy is a mistake and that the subtotal operation is much more satisfactory except in cases in which the cervix is grossly diseased. All agree that the total operation should be done if malignant disease is present in the ovaries, in the body of the uterus, or in the fallopian tubes.

This problem is one which comes up for discussion frequently on the Stanford gynecological service at the San Francisco City and County Hospital. This service has been used for many years as the minor teaching unit of the department of obstetrics and gynecology of the Stanford University School of Medicine. The visiting staff is made up of members of the clinical faculty of the school. Most of the members of the staff are graduates of the Stanford School of Medicine who also received most of their postgraduate training there. Yet, within this group of physicians whose training has been almost identical there is no agreement on this important subject. A considerable amount of confusion amongst medical students, interns, and house officers results when one staff member recommends total hysterectomy as the treatment of choice for a patient, only to have another member disagree and recommend subtotal hysterectomy.

As there must be some reason for this honest difference of opinion, this presentation will discuss the points that are brought up whenever this con-

troversy arises, describe briefly a technique of total hysterectomy that has been used by some of the members of the staff on the service as well as in private practice for many years, point out a few steps in techniques which may eliminate some of the dissatisfaction with the total operation, discuss briefly the mortality rates associated with the two methods, and present the conclusions of the author.

The proponents of total hysterectomy base their preference on the following points:^{2, 4, 5, 9, 11}

1. Subsequent carcinoma of the cervix is eliminated.
2. Vaginal discharge is almost never a troublesome symptom following operation, as it frequently is following subtotal hysterectomy.
3. Irregular bleeding and spotting does not occur as it frequently does following the subtotal operation.
4. A greatly increased chance of complete cure is to be expected in those cases in which carcinoma is unexpectedly found on microscopic examination of the ovaries, fallopian tubes or body of the uterus removed at operation.
5. Carcinoma of the cervix or carcinoma in situ is occasionally found in the apparently normal cervix.
6. The stump of the cervix may act as a focus of infection.
7. Prolapse of the vagina is less likely to occur due to the absence of the heavy cervix.
8. Drainage through the vaginal vault may at times be advantageous.
9. Postoperative mortality and morbidity rates need not be any higher than in subtotal hysterectomy.
10. Postoperative pulmonary emboli and thrombophlebitis are less frequent.

This is certainly an impressive list of reasons for the routine use of total hysterectomy. However, those who favor the subtotal operation are not convinced, and advance the following arguments against its routine use:^{1, 3, 8}

1. The postoperative mortality in total hysterectomy in general throughout the country is from 1 per cent to 2 per cent higher than in subtotal hysterectomy.
2. The incidence of carcinoma of the cervix in the general population is only 0.2 per cent to 0.3 per cent. The incidence of cervical stump carcinoma is the same as in the general population. Therefore, all advantage of the total operation from this point of view is lost due to the higher mortality rate associated with it.

Chairman's address: Presented before the Section on Obstetrics and Gynecology at the 79th Annual Session, April 30-May 3, 1950, San Diego.

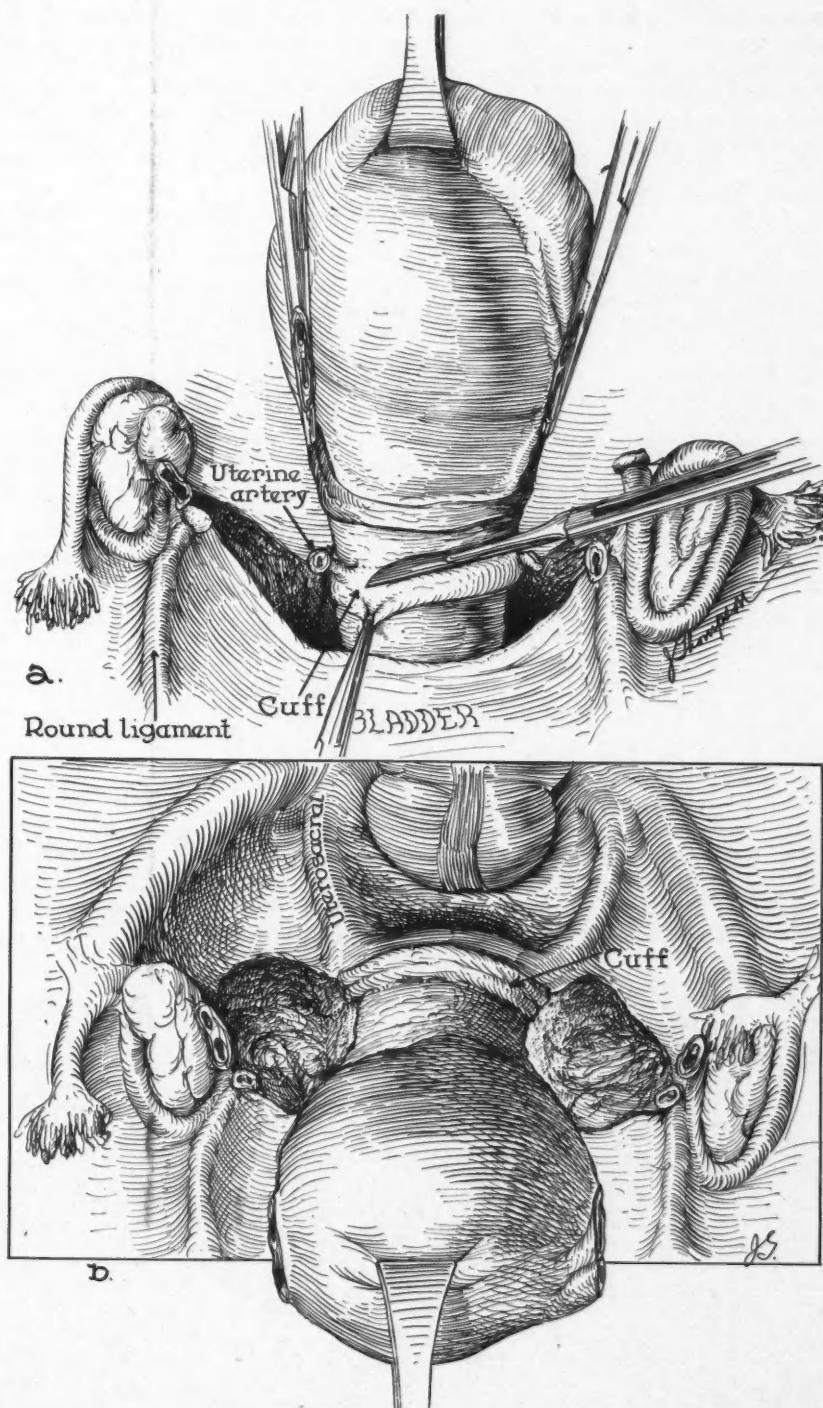


Plate 1.—(a) Beginning of the development of the cuff. Note that it is done with side of the knife blade while upward traction is made on uterus. The cuff is much thicker and more vascular than that utilized in other techniques. (b) Posterior view of cuff early in its development. Note that uterosacral ligaments are not clamped but later become part of cuff.

3. The vagina is frequently shortened as a result of total hysterectomy.
4. Patients frequently complain of dryness of the vagina following total hysterectomy.
5. The formation of scar tissue frequently results in a fixed and rigid vaginal vault which is often tender and painful.
6. Dyspareunia following operation is much more common.
7. Dysuria is a common postoperative symptom.
8. The psychological effect of total hysterectomy on the patient and/or her husband is often a considerable factor. Women of the type frequently treated in clinics and county hospitals who have not had many of the educational and cultural advantages of private patients often feel that they have been desexed. Their husbands sometimes feel that their wives are no longer feminine and refuse to have further sexual relations with them. They state that coitus is no longer satisfactory and they may

soon begin to roam. (No reference to this point has been observed in the literature and the author has never heard it mentioned by patients in private practice, but it has been a factor in many cases at the San Francisco Hospital. The author considers this to be the strongest argument against total hysterectomy as a routine operation in unenlightened patients.)

9. Total hysterectomy is much more difficult to perform and is more time-consuming; blood loss is greater and shock is more likely to occur.
10. Contamination from the open vagina is almost unavoidable.
11. Injuries to the bladder, rectum and ureters are more common. Most of the vesicovaginal and ureterovaginal fistulae observed today are the result not of childbirth but of total hysterectomy.
12. Tying off of one or both ureters is much more liable to occur during total hysterectomy.
13. The operation is extremely difficult to carry

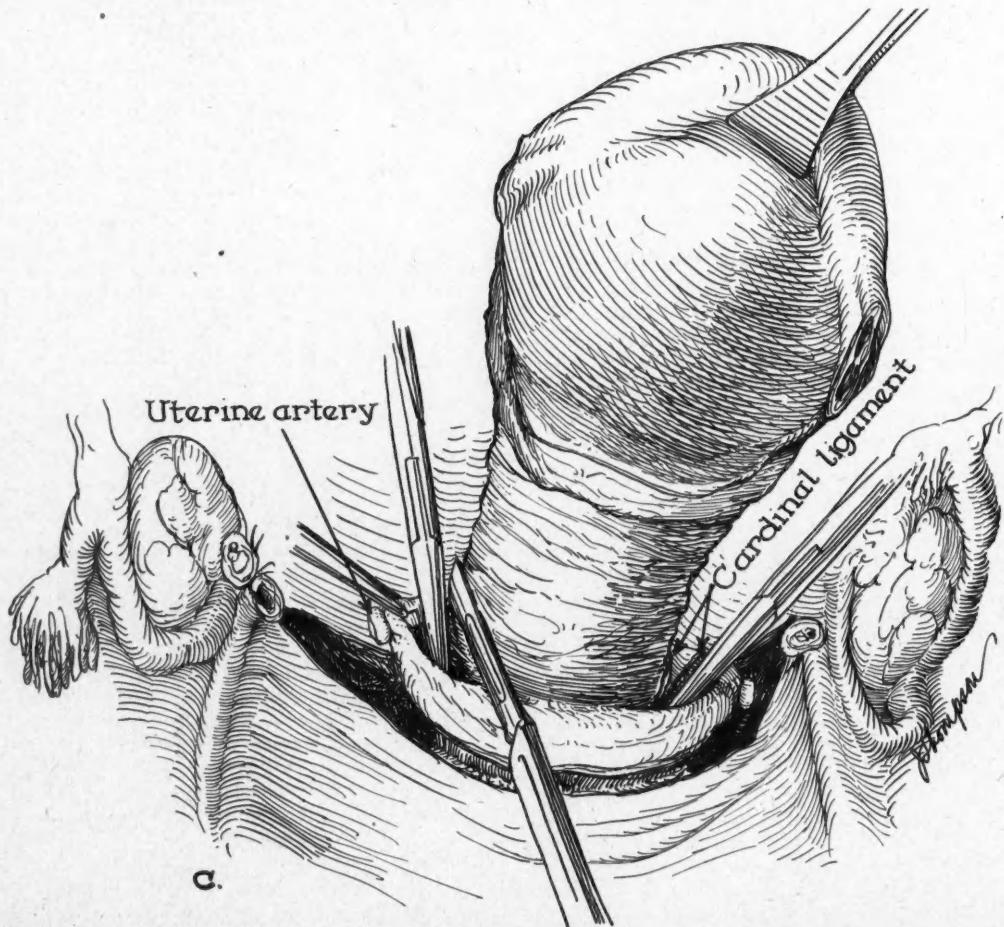


Plate 2.—(c) The cardinal ligaments are clamped inside the cuff. The clamps are placed as nearly parallel as possible to the cervix.

out in obese persons, in those with deep pelvis, or in patients with dense adhesions due to endometriosis or pelvic inflammatory disease.

14. It is not a good operation for patients not in otherwise good health—that is, those with heart

disease, pulmonary tuberculosis, hypertension, diabetes, etc.

TECHNIQUE FOR TOTAL HYSTERECTOMY

A technique by which total hysterectomy can be done with a very low mortality rate, and one which

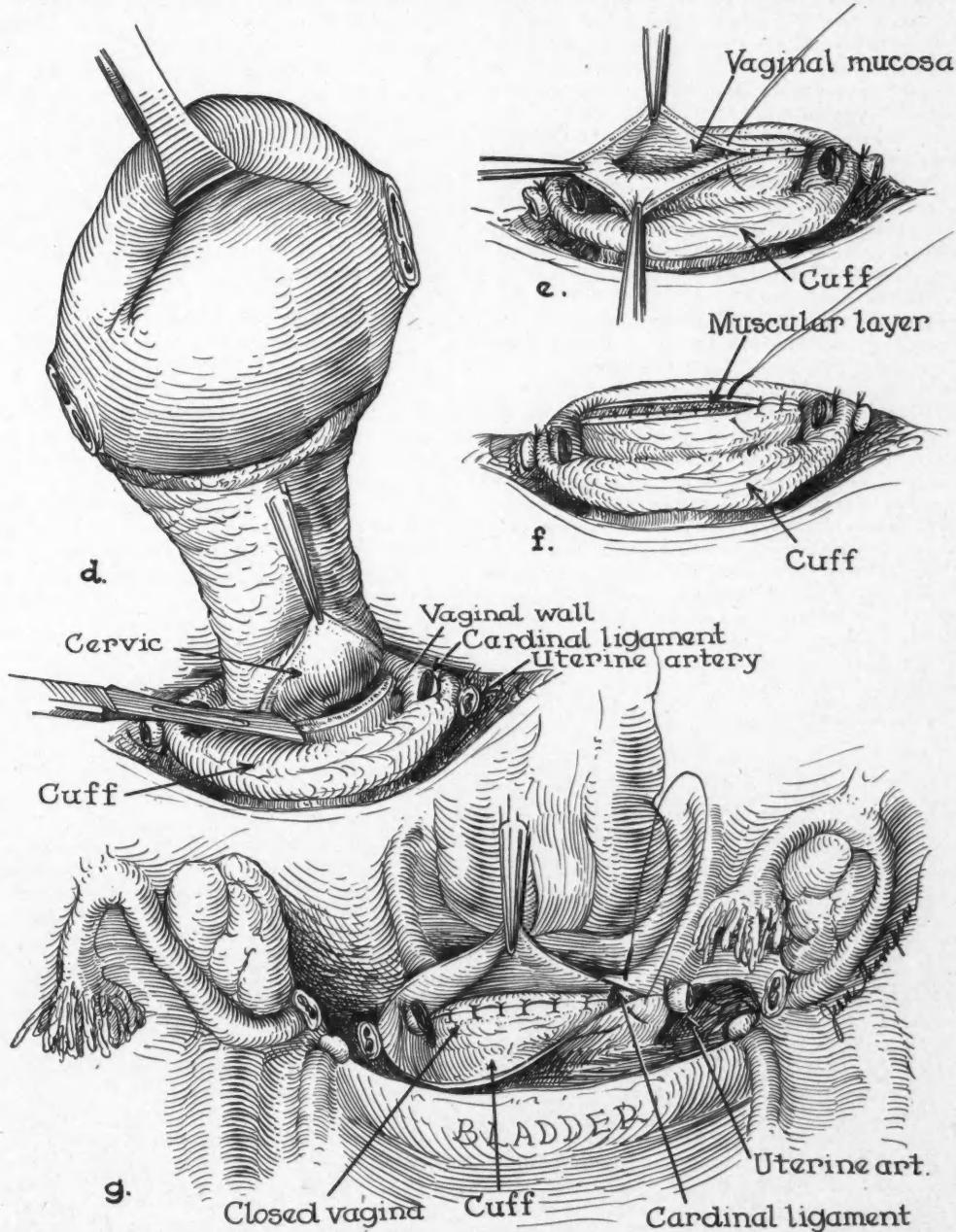


Plate 3.—(d) The vagina is opened anteriorly and cut around under vision as closely as possible to the cervix. (e) The vaginal mucosa is closed separately with interrupted fine chromic sutures. (f) The muscular layer of the vagina is also closed separately with interrupted fine chromic. Note thickness of cuff. (g) The cuff, including the cardinal and uterosacral ligaments, is closed with a loosely placed continuous plain suture. Dead space is eliminated by including the muscular coat of the vagina in several loops of the suture.

eliminates many of the faults charged to total hysterectomy, has been devised. The procedure is identical with that usually carried out, up to the point at which the uterine arteries are clamped, cut and ligated (the bladder having already been freed and pushed downward well below the cervix). At that stage, the uterus is grasped with a suitable instrument and fairly strong upward traction is made on it. Using a No. 21 Bard Parker knife blade on a long handle, an incision about 2 mm. deep is made completely around the cervix at the level of the severed uterine arteries. Continuing the upward traction on the uterus, a series of downward scraping movements with the side of the knife blade are made all the way around the cervix so that a cuff of fascia and superficial cervical tissue about 2 mm. thick is slowly developed. Using a straight Kocher clamp, the cardinal ligaments are clamped inside this cuff parallel with the cervix on each side. The ligaments are cut free and ligated. The cuff is then further developed until the vagina is reached. This cuff is of a very vascular tissue (therein lies one of its chief merits) and it is usually necessary to ligate several fairly large vessels in it during development of it. The vagina is opened anteriorly at the very edge of the cervix and is cut around its entire circumference under vision without sacrificing any of its mucous membrane. The vaginal mucosa is then closed with meticulous care, using interrupted fine chromic sutures placed close to the margin so that the vagina is not shortened. The muscular layer of the vaginal wall is then similarly closed. The vascul-

lar cuff, including the cardinal ligaments, is then closed over the vault of the vagina by means of a loosely placed continuous plain suture. The stumps of the round and broad ligaments are left where they naturally lie and the pelvis is peritonealized utilizing the bladder peritoneum. This is done with a continuous fine plain suture placed so that the round and broad ligament stumps are inverted. The operation is then completed in the usual manner.

This technique has been slowly developed and used by some of the staff on the Stanford service at the San Francisco Hospital and in private practice for the last 20 years. (The author does not know who originated the method but himself learned the principles of it from the late Dr. A. V. Pettit.) It is tedious, time-consuming, and occasions somewhat more bleeding than do many other techniques which are widely used. Properly done, it eliminates several of the faults attributed to total hysterectomy as follows:

1. The vagina is not shortened.
2. Dryness of the vagina is rarely mentioned by the patient.
3. The vaginal vault is not fixed but is freely movable, pliable, and not tender. This is the result of not sacrificing any of the vaginal mucosa, of the meticulous care with which the vault is closed (which results in healing almost without scar formation), and of the excellent blood supply to the tissues about the vault supplied by the vascular cuff. There is no tension exerted on the vault by over-

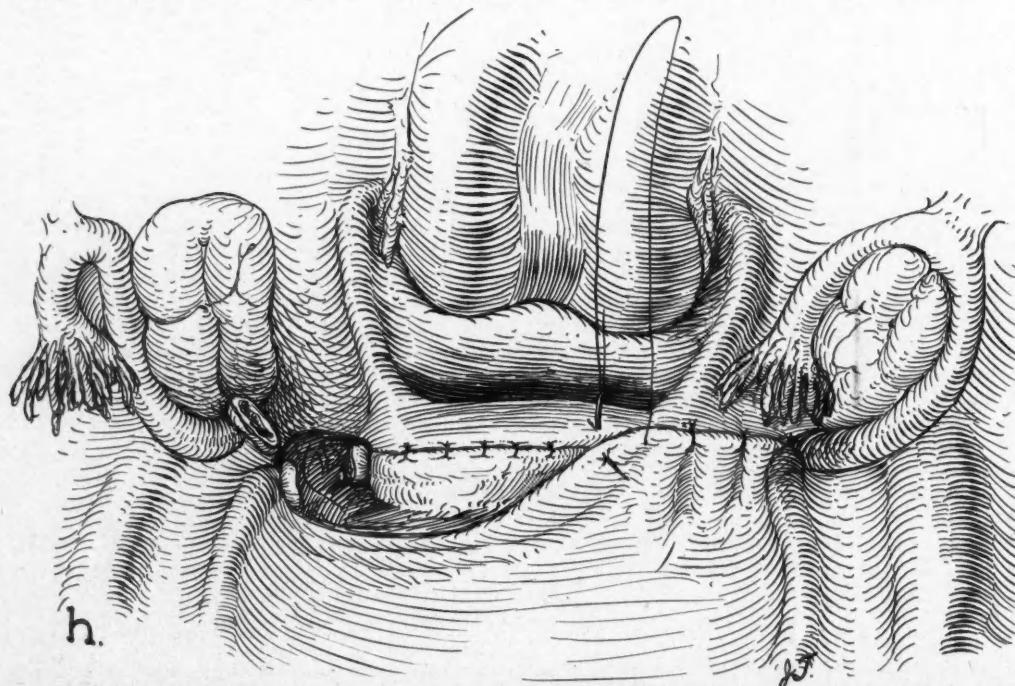


Plate 4.—(h) Raw surfaces are covered with peritoneum. The stumps of the round and broad ligaments are not sutured to the vagina but are left where they normally lie and are inverted by the peritonizing plain catgut suture.

stretched round ligaments. The ovaries are not attached to the vault in an abnormal position.

4. Dyspareunia as a postoperative complaint is almost unheard of.

5. Injuries to the bladder, ureters and rectum are unlikely, as they lie outside the cuff, well away from clamps and sutures.

6. Prolapse of the vagina has not occurred, to the author's knowledge, following the use of this technique.

7. The postoperative mortality rate is just as low as in subtotal hysterectomy.

8. Postoperative convalescence, using early ambulation, is remarkably rapid and smooth.

There are several points in technique which the author feels are extremely important in obtaining the best possible results in total hysterectomy for benign lesions:

1. The vagina should never be clamped across with any kind of clamp. This maneuver inevitably causes shortening of the vagina.

2. The vaginal mucosa should be closed separately with great care, using fine interrupted chromic sutures. The use of figure 8 sutures, purse-string sutures or tightly drawn continuous sutures results invariably in puckering of the vault with consequent shortening, scar tissue formation and fixation.

3. The stumps of the round ligaments should not be attached to the vault of the vagina if this puts any tension whatsoever upon the ligaments, as pain and dyspareunia are too liable to follow.

4. The ovaries, if not removed, should be allowed to remain in their normal position, and not fixed to the vaginal vault because this often interferes with their blood supply and places them in a position where they sometimes cause dyspareunia.

5. Clamping the cardinal ligaments inside the cuff or inside the uteropubic fascia as described by Judd⁷ almost precludes injury to the ureters and bladder in this area. The development of a cuff or the separation of the uteropubic fascia is an extremely important safety measure, and one or the other should always be done except in the presence of malignant disease.

6. Careful preparation of the vagina just before operation is well worth while, and "spill" from the vagina can be prevented by grasping the edges of the cut vaginal mucosa with Allis forceps as the cervix is excised, thus keeping the vault of the vagina elevated. All contaminated instruments should be discarded.

7. The steps of the operation concerned with excision of the cervix and closure of the vault must be done deliberately, meticulously and without hurry.

The mortality rate associated with total hysterectomy the country over is probably at least 1 per cent higher than that of subtotal hysterectomy. The statement of the proponents of subtotal hysterectomy,

that the mortality rate of total hysterectomy exceeds the combined mortality rate of the subtotal operation plus that of stump carcinoma, is probably true. That this need not be so is well known. The post-operative mortality rate of total hysterectomy has fallen steadily in the teaching clinics and in specialist practice until at present it is actually lower than the mortality rate for subtotal hysterectomy.² The mortality rate associated with total hysterectomy on the Stanford service at the San Francisco Hospital for the years 1932 to 1938 was 2.7 per cent. The mortality rate for subtotal hysterectomy for the same period was 1.6 per cent. A pronounced change has taken place since that time, however. The post-operative mortality rate for the total operation for the years 1944 to 1950 was 1.1 per cent, and for the subtotal operation, 1.4 per cent. The fact that the mortality rate for total hysterectomy was actually lower than that for subtotal hysterectomy was probably owing to the use of the subtotal operation in the extremely difficult cases. This improvement in the last decade was brought about by several factors. The liberal use of blood transfusion pre-operatively, during operation and postoperatively was probably the most important factor. The sulfa drugs and the antibiotics have been used with great effectiveness and are a factor second only to blood transfusion. Great credit must be given to the anesthetists, whose methods have improved and whose skill has increased greatly. A very low mortality rate cannot be achieved in total hysterectomy without superior anesthesia. Proper preparation of the patient for operation, which may require weeks, and the intelligent evaluation of the temperature chart, leukocyte count and blood sedimentation rate are essential to a low mortality rate. This is especially true in county hospitals where pelvic inflammatory disease is the indication for hysterectomy in the great majority of cases. In private practice where pelvic infections are rarely a problem, the mortality rate for total hysterectomy should approach zero.

From the foregoing discussion, and from personal experience with the two types of operation, the author believes the following conclusions are warranted:

1. When properly carried out under excellent anesthesia in a well prepared patient, with adequate blood available for transfusion during and after operation, the mortality rate following total hysterectomy is no higher than that following subtotal hysterectomy. It is, therefore, one of the important measures at present available for prevention of carcinoma of the cervix.

2. When subtotal hysterectomy is elected, the burden of proof that malignant disease does not exist in the cervix, in the body of the uterus or in the adnexae rests entirely on the surgeon. It behooves the surgeon who prefers subtotal hysterectomy to do an extremely careful examination on the patient and to use vaginal smears and biopsy in almost every case before deciding on subtotal hysterectomy as the operation of choice.

3. When total hysterectomy, using the technique described, can be done without undue risk to the patient, without danger of injury to other structures and without psychological damage to the patient or her husband, it will give a more satisfactory end result in the great majority of patients than will subtotal hysterectomy.

4. When during the course of a planned total hysterectomy for benign lesions it becomes apparent that removing the cervix will increase the risk to the life of the patient or endanger the integrity of the bladder, ureters or rectum, then the attempt to remove the cervix should be abandoned, and subtotal hysterectomy performed. Should the cervical stump subsequently be the source of troublesome symptoms, it can be removed through the vagina with practically no risk.

490 Post Street.

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The Use of Antithyroid Drugs

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SUMMARY

The preoperative use of antithyroid drugs is mandatory if surgical treatment of complicated hyperthyroidism is contemplated. Six months to a year may be required for suitable preparation.

The long-term use of antithyroid drugs is less effective for the "cure" of hyperthyroidism than is operation or the use of radioactive iodine.

Propyl and methyl thiouracil are the anti-thyroid drugs of choice.

Either of these thiouracil derivatives is capable of producing leukopenia.

The antithyroid drugs exert no favorable effect on exophthalmos.

The antithyroid drugs are suitable for the control of hyperthyroidism during pregnancy. The patient probably should not be kept hypothyroid during pregnancy but rather in a state of mild hyperthyroidism.

IT is less than eight years since Astwood published his first clinical impressions of the efficacy of certain drugs for the treatment of hyperthyroidism.³ Astwood's impressions have since been broadened, as noted in a recent review by him.² An antithyroid drug might be considered as any substance capable of interfering with the formation, storage, or secretion of thyroid hormone. Numerous such substances, ranging from the familiar iodide or iodine to thiocyanates, thiourea, thiouracil and its derivatives, amino benzene derivatives and possibly certain adrenal cortical hormones, have been described and tested.

In this country, when the term antithyroid drug is used it connotes to clinicians either thiourea or thiouracil and its derivatives. Four drugs have emerged from the large groups originally studied. They are thiourea, thiouracil, methylthiouracil and propylthiouracil; these four are generally available and hence are the drugs considered for practical use. All of them act by inhibiting the formation of thyroid hormone. Just how this is done is obscure. They do not prevent the trapping of iodide by the thyroid gland, an action specifically blocked by thiocyanates, but in some way prevent the next step in thyroid hormone formation, namely the conversion of iodide to iodine with its subsequent organic bind-

ing and transformation to hormone.^{2, 27} The drugs seem to have no effect on already formed thyroid hormone either stored or circulating, and until such hormone has been consumed, the metabolic effects of the drugs will not be noted.

The problems of the use of antithyroid drugs have been concerned largely with their effect in hyperthyroidism; other uses such as in the treatment of thyroiditis¹² and the handling of carcinoma of the thyroid gland²⁵ are outside the scope of this discussion. The concern here will be centered about (1) indications for antithyroid therapy, (2) selection of drug, (3) techniques of use, (4) results of antithyroid therapy as a preoperative measure—and as a measure for the long-term control of hyperthyroidism, and (5) the use of the drug in management of such clinical problems as exophthalmos and in pregnancy.

INDICATIONS FOR ANTITHYROID DRUG THERAPY

The decision implied here involves a choice between antithyroid drugs, radioiodine and operation as an instrument of definitive therapy; there seems to be little argument against the use of the drugs as a preoperative measure. The advantages and disadvantages of the drugs in comparison with other forms of therapy may be described as follows:

Advantages

1. Availability: Permanent storage and easy shipment of antithyroid drugs give them a pronounced advantage over radioiodine. The advantages of a simple oral medication, other factors being equal, over operation need no emphasis.

2. Reversibility of action: No organs are destroyed or excised by these drugs. Their effect should be thought of as inducing an "artificial remission" of hyperthyroidism until such time as the "natural remission" occurs. At this point, the drug may be stopped and its effects will have left no permanent mark on the patient.

3. Control: The antithyroid drugs offer a method of the most delicate variability for controlling hyperthyroidism. By suitable changes in dosage of the drug, a patient may be led through all degrees of thyroid activity from his own original hyperthyroidism to profound myxedema. He may be maintained, at the discretion of the physician, at whatever level of thyroid activity is desired. This may be of importance in the treatment of hyperthyroidism during pregnancy.

Disadvantages of Antithyroid Drugs

1. Duration of treatment: Observation of 12 months or more is frequently difficult; shorter periods of treatment than 12 months seem to reduce

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the incidence of remissions. Astwood meets this objection by advising the physician, and thus indirectly the patient, to regard hyperthyroidism as a chronic illness which requires chronic treatment.²

2. Toxicity: The toxicity of certain thiouracil derivatives is certainly no greater and perhaps less than the morbidity associated with thyroidectomy.^{10, 17} On the other hand, radioiodine, unless it proves some day to have been carcinogenic, is less toxic than the antithyroid drugs.

3. Uncertainty of permanent results: There is no way at present to determine what patients will have relapse even after prolonged therapy with antithyroid drugs. In some series such as that of Rose and McConnell²² or Starr and co-workers,²⁴ upwards of 50 per cent of the patients have had relapse after cessation of treatment.

If these so-called advantages and disadvantages are kept in mind, in what circumstances would antithyroid drugs be used—assuming equal availability of a competent surgeon and technical ability to use radioiodine? Members* of the Thyroid Clinic, Los Angeles County Hospital, feel that antithyroid drugs should be used:

1. As a preoperative measure in (a) young patients with uncomplicated hyperthyroidism, (b) patients with cosmetic or mechanical defects from a toxic goiter, and (c) patients with hyperthyroidism and possible malignant disease of the thyroid gland.

2. As a temporary control of hyperthyroidism during pregnancy.

3. For the occasional remaining patient who because of psychiatric, situational or other reasons is not suitable for treatment with radioiodine.

If radioactive iodine is not available, then operation should be considered the treatment of choice for hyperthyroidism of all sorts. Antithyroid drug therapy alone should be resorted to only for patients who cannot be rehabilitated satisfactorily during preoperative preparation with the antithyroid drugs or who offer extreme technical problems. If only indifferent surgical skill is available, it is probably best to treat all patients with antithyroid drugs until such time as suitable operation can be arranged.

There is a small group of cases of acute hyperthyroidism that start during periods of generalized metabolic disturbance—in adolescence, pregnancy, lactation, and menopause, for example—and in such cases controlling the hyperthyroidism with drugs for a few months, in the hope of early permanent remission, is justified.

CHOICE OF DRUG

The choice for the physician today lies amongst thiouracil, propylthiouracil, methylthiouracil, and possibly thiourea. The problem is to pick the most potent and least toxic drug. The potency of antithyroid drugs has been assayed on the basis of (1) the

ability of the drug to induce hyperplasia of the thyroid gland of rats⁴ and (2) the ability of the drug to block iodine uptake by the thyroid gland.²³ Another approach to the determination of potency has been that of McGinty and co-workers,¹⁶ who studied the excretory products of thiouracil and certain of its derivatives. These studies showed a higher degree of conjugation inactivation of propyl and benzyl thiouracil than of thiouracil or methylthiouracil. Results of assays of the kinds mentioned have not agreed either with one another or with clinical results. Table 1 shows the contrasting potencies of some antithyroid drugs as ascertained by various animal tests and by clinical impressions. Propylthiouracil appears to be the most goitrogenic, in rats, of the drugs mentioned but to have a lower ability to inhibit radioiodine uptake. Williams²⁷ in a study of the ability of certain antithyroid drugs to control hyperthyroidism in man placed the drugs in the following order of decreasing potency: 6 propylthiouracil, 6 methylthiouracil, and thiouracil.

Most opinion seems agreed that thiouracil is less potent than methylthiouracil or propylthiouracil. Thiourea has been studied rather carefully by the Yale group,²⁰ and they feel it to be the most potent of the various thioantithyroid drugs. Their dosage schedules have been low and apparently effective—as little thiourea as 70 mg. a day producing and maintaining remission. Further studies should be done with this compound. The author's clinical impression of the potency of methyl as against propyl thiouracil may be summed up in the following observations: Forty patients were treated with propylthiouracil, with doses as high (in one case) as 600 mg. daily for periods up to nine months; in seven cases neither clinical control nor satisfactory lowering of the protein-bound iodine²⁴ was achieved. To date with the treatment of 65 patients with methylthiouracil, there have been no failures to control the disease.

TOXICITY

The toxicity of thiouracil,^{18, 26} thiourea,²⁰ propylthiouracil,^{5, 6, 13, 15} and methylthiouracil,^{9, 14, 15} to mention but a portion of the studies done, has been a matter of concern to all investigators. The reactions observed have been generally in the following classifications: fever, skin rashes, leukopenia and agranulocytosis, arthralgia and muscle pains with a miscellaneous group of reactions such as parotitis, gastrointestinal upsets, and hepatic disturbances.

TABLE 1.—Potency of Antithyroid Compounds as Determined in the Laboratory and in Patients. Thiouracil Was Assigned an Arbitrary Value of 1.

Drug	Goitrogenic Potency in Rat	Inhibition Radio-iodine Uptake	Ability to Control Hyperthyroidism
Thiouracil	1 ¹⁶	1 ²	1 ²
Thiourea	1 ¹⁶	1 ²	{ Most potent ²⁰ 1 ²
Methylthiouracil	1.15 ¹⁸	2 ²	1-3 ²
Propylthiouracil	11 ¹⁶	0.75 ²	1-5 ⁷

*Doctors Paul Starr, Boris Catz, Richard Johnson, Benjamin Simkin, Frederick Scharles, George L. Steeple, and Robert L. Stirrett.

The total incidence of reactions from the various compounds is compared in Table 2. The principal finding here is the lack of agreement between investigators; however, both thiouracil and methylthiouracil appear more toxic than propylthiouracil.

It is difficult to assess the incidence of reactions, because they will increase with the assiduity with which the physician searches for them. Thus in the small group of 40 patients studied by Starr and co-workers, there were six instances of transient leukopenia; in five of the six cases this reaction abated without cessation of therapy. In none of the six cases was the reaction "symptomatic." If the patients had been turned loose with instructions to report only if they detected any signs of toxicity, as advocated by some investigators,¹⁴ then reaction would not have been recorded in any case in Starr's series. All the antithyroid drugs under consideration here have been reported as producing leukopenia

and agranulocytosis. The incidence of this is apparently lower in treatment with propyl and methyl thiouracil and thiourea than in thiouracil therapy. The author's experience with propylthiouracil was that cessation of treatment was not required in any of 40 cases. Reactions developed in seven of 66 patients treated with methylthiouracil,* and in three cases cessation of treatment was necessary.

Two patients in whom jaundice developed (Table 3) were studied carefully but no evidence of anything that would specifically incriminate the anti-thyroid treatment was found. In the case in which abrupt onset of diabetes mellitus occurred ten weeks after methylthiouracil therapy was started, there was suggestion of generalized metabolic disorder of some sort, with incidental hyperthyroidism.

From the experience and reports described here there would not appear to be need to stop anti-thyroid treatment because of leukopenia unless absolute granulopenia developed concomitantly. Fever and arthralgia are considered as potentially serious reactions by Peters and co-workers²⁰ and should be watched carefully.

It appears that thiouracil is more toxic and less potent than the other drugs studied; the experience with thiourea has been limited in comparison with propyl and methyl thiouracil. These factors tend to

*Methylthiouracil, "Muracil®," was supplied by Doctor K. W. Thompson of Organon Inc., Orange, New Jersey.

TABLE 2.—Comparison of Over-all Toxicity of Various Antithyroid Drugs

	Thiouracil (Per Cent)	Propyl- thiouracil (Per Cent)	Methylthiouracil (Per Cent)	Thiourea (Per Cent)
Incidence of all reactions noted by various investigators	13 ²⁶ 8-10 ¹⁸	2 ⁶ 2 ¹⁵	9.3 ⁹ 13 ¹⁸ 5 ¹⁴	2-6 ²⁰

TABLE 3.—Data on Seven Cases of Toxic Reaction in Series of 66 Patients Treated with Methylthiouracil

Age and Sex	Diagnosis	Reaction	Preceding Treatment	Course
F. 41	Primary hyperthyroidism	Fever; arthralgia	Methylthiouracil 400 mg. daily 10-20-48 to 11-3-48; developed fever, drug stopped one week, fever gone; restarted 400 mg. daily in three weeks, then developed arthralgia.	Drug continued on dose levels of 300 mg. daily to 500 mg. daily for 11 months with continuous fluctuating arthralgia. After total 13 months treatment, drug stopped. Relapsed 2 mos.
F. 47	Primary hyperthyroidism	Arthralgia	Methylthiouracil 400 mg. daily 11-6-48 to 11-24-48; 200 mg. daily to 12-12-48. Drug stopped because of severe generalized arthralgia, subcutaneous thickening palm of right hand which began 11-24-48.	Relapsed Jan. 1949, treatment with radioiodine, arthralgia persisted until Sept. 1949. Non-toxic, well Jan. 1950.
F. 80	Primary hyperthyroidism; heart disease	Arthralgia	4 months after beginning methylthiouracil 400 mg. daily, first complained of arthralgia. Stopped methylthiouracil for 1 week and restarted at higher dose.	Arthralgia continued while on methylthiouracil (9 months of varying doses) lessened 2 months after drug stopped.
F. 27	Primary hyperthyroidism	Arthralgia	4 months after starting methylthiouracil, first complained of arthralgia. Reduced dose 3 weeks after first complaints from 400 mg. daily to 300 mg. daily.	Methylthiouracil continued 7 months after complaints of arthralgia with no further complaints of this nature.
F. 33	Primary hyperthyroidism	Jaundice	Methylthiouracil started Nov. 1948. Became pregnant Jan. 1949; miscarried June 1949. Subsequently became jaundiced. Was taking methylthiouracil 50 mg. daily at time of miscarriage.	Jaundice subsided after cessation of methylthiouracil and while taking propylthiouracil.
F. 39	Primary hyperthyroidism	Jaundice	Jaundice started 6 weeks after beginning methylthiouracil — while taking methylthiouracil 300 mg. daily. Methylthiouracil stopped 3 days after jaundice noticed.	Jaundice subsided after cessation of methylthiouracil. Hyperthyroidism treated by surgery (3 weeks after discontinued methylthiouracil).
F. 32	Primary hyperthyroidism	Diabetes mellitus	400 mg. of methylthiouracil daily for 10 weeks; developed abrupt nausea, vomiting, polyuria and thirst, glycosuria and hyperglycemia.	Thyroidectomy.

place the choice of drug between the propyl and methyl thiouracil derivatives. There is no clear-cut advantage discernible at this time for either drug.

TECHNIQUE FOR USE OF ANTITHYROID DRUGS

For reasons previously given, thiouracil will not be considered. (Readers interested in thiourea are referred to Peters.²⁰)

Preoperative management. The whole purpose of using antithyroid drugs preoperatively is to attain complete control of the hyperthyroid state. If the physician is satisfied with less, he might as well use iodine alone. There no longer exists a reason for carrying out thyroidectomy before full control is achieved. Particular emphasis should be placed on the preoperative preparation of the patient in whom age, general debility, pronounced malnutrition, heart failure, etc., are complicating factors. These patients should be prepared leisurely; it may take six months to a year to bring such a person to the point where operation can be done. Not only should the hyperthyroidism be controlled, but the patient should be kept euthyroid long enough before operation to permit him to recover from the ravages of the disease. It is in such patients that the greatest advantage of these drugs, over iodine solution, as a preoperative measure is to be found.

1. Dosage: Propyl or methyl thiouracil, 400 mg. daily in four divided doses of 100 mg. each. This dose is kept up until the basal metabolic rate has

dropped to one-half its pretreatment level, or until the protein-bound iodine is below 7 micrograms per 100 cc. of serum. When this point is reached, a maintenance dose of 200 mg. per day is used. The average patient will be non-toxic in three to four weeks. However, there should be no hesitancy to continue therapy for six months or more to attain complete control.

2. The use of iodine: The involuting effect of iodine on the hyperplastic thyroid acts across a thiouracil block.²¹ Thus, while the antithyroid drug prevents the iodination of thyroid colloid, it does not prevent iodine from promoting its usual effect of decreasing vascularity and flattening epithelium.

Most clinics advocate the use of iodine in doses of 10 to 30 drops of Lugol's solution daily during the last three weeks of preparation for operation with antithyroid drugs. If there is any question of escape from control, the antithyroid drug should be continued, with the iodine, to the day of operation.

At some centers⁶ small amounts of iodine (8 to 10 mg.) are used from the start of preparation. In most uncomplicated cases of hyperthyroidism preparation may be carried out on an out-patient basis. The time is generally four to eight weeks.

A patient who has been taking iodine for several weeks or months will respond to antithyroid drugs slowly. In the case of the occasional patient who is moderately toxic and who has had months of iodine

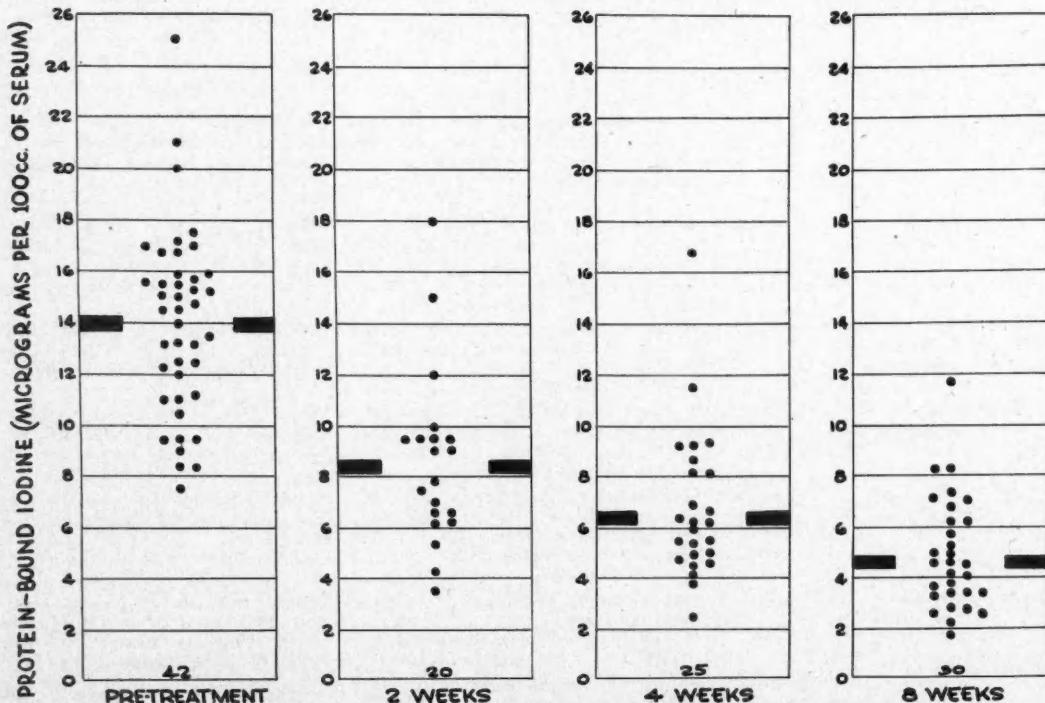


Chart 1.—Changes induced in the protein-bound iodine level of 42 patients with hyperthyroidism by treatment with methylthiouracil (400 mg. daily). Number of patients tested at time intervals as indicated at bottom of each column.

ingestion, the handling may be difficult. Cessation of iodine therapy and institution of antithyroid therapy may well be followed by exacerbation of the toxic state. Such patients must be watched closely, and it will probably be necessary to treat them for several weeks to attain a satisfactory result.

The value of antithyroid drugs as a preoperative measure is shown in a report by Bartels⁶—the operative mortality rate dropped from 1.49 per cent to 0.17 per cent in the years following the use of these drugs.

ANTITHYROID DRUGS FOR THE LONG-TERM CONTROL OF HYPERTHYROIDISM

The aim of treatment in long-term control of hyperthyroidism is the maintenance of a state of mild hypometabolism for a period of at least 12 months with as small an amount of drug as possible.

The initial doses of propyl and methyl thiouracil are the same as those used in preoperative care. As soon as the basal metabolic rate or the protein-bound iodine drops appreciably, the dose of the drug should be cut gradually to a maintenance level of 50 to 100 mg. daily.

The leukocyte count should be checked weekly during the institution of therapy, and monthly thereafter. All patients should be instructed to stop the drug and report if fever, sore throat, skin rash, or any other symptoms of unwellness develop.

Treatment should be continued for at least 12 months. Even this, however, may not be long enough inasmuch as many patients have sudden relapse^{22, 24} after long periods of observation. In a not yet completed study of methylthiouracil by the Thyroid Clinic of the Los Angeles County Hospital, ten patients were kept euthyroid or hypothyroid for 12 months or more; of these, five had relapse within two months after cessation of treatment.

The excellent results with long-term antithyroid therapy reported by some investigators^{2, 9, 17} have not been duplicated in the author's experience.

The rate of initial response to antithyroid drugs is variable. Bartels⁶ stated that one day will be required for each point the basal metabolic rate is elevated. The author has used the protein-bound

iodine determination to follow patients. Chart 1 shows the rate at which the iodine level fell in a group of patients treated with 400 mg. of methylthiouracil daily. A significant percentage were still abnormal at the end of eight weeks.

ANTITHYROID DRUGS AND CERTAIN COMPLICATIONS DURING HYPERTHYROIDISM

Exophthalmos. It has been the author's impression that exophthalmos was either worsened or unaffected by treatment of hyperthyroidism with antithyroid drugs. In five patients (Table 4) who had severe eye problems, there were four whose eyes seemed to be unaffected and one whose eyes, to the observers, seemed to worsen under treatment. Measurements of the eyes improved in one patient, a man. McCullagh¹⁴ reported that seven of nine cases of exophthalmos worsened during treatment with methylthiouracil. These results are similar to those observed after thyroidectomy.

Pregnancy. Qualified observers are divided on the merit of antithyroid drugs during pregnancy. Astwood² tentatively approved of them while Mussey and co-workers¹⁹ were not sure they should be used. Acton and Cottrell¹ collected reports of 15 cases of pregnancy and hyperthyroidism treated with thiouracil or its derivative and added a report of a case observed by them. Fifteen of the 16 patients delivered normal infants. In one case spontaneous abortion occurred at six months; the thyroid gland in the fetus was described as hyperplastic. Hone and Magarey¹¹ reported the birth of a cretin to a woman who had received methylthiouracil during seven months of pregnancy. In experiments with animals the transmission of antithyroid drugs to the offspring via the lactating breast⁷ and transplacental transmission to the fetus⁸ have been demonstrated.

Three patients were treated by the Thyroid Clinic of the Los Angeles County Hospital for hyperthyroidism during pregnancy (Table 5). All three conceived when they were either euthyroid or mildly hypothyroid under antithyroid medication. In two of the patients the protein-bound iodine was allowed to rise during pregnancy to 10 to 13 micrograms per 100 cc. of serum. These two delivered normal babies.

TABLE 4.—Description of Eye Changes in Five Patients with Exophthalmos Under Treatment with Antithyroid Drugs

Diagnosis	Hertel Proptometer Reading Before Treatment	Treatment and Changes	Hertel Proptometer Reading During or After Treatment
Recurrent hyperthyroidism	OS 23 mm. OD 23 mm.	Methylthiouracil 400 mg. daily and desiccated thyroid 0.25 gm. daily for 2 months. No clinical improvement in this time.	OS 23 mm. OD 24 mm.
Recurrent hyperthyroidism	OS 27 mm. OD 27 mm.	Methylthiouracil 400 mg. daily for 6 weeks.	OS 25 mm. OD 25 mm.
Hyperthyroidism and ophthalmoplegia		Methylthiouracil for 9 months. Clinical impression: no betterment of ocular palsy or exophthalmos during treatment.	
Severe exophthalmos and hyperthyroidism	OS 22 mm. OD 28 mm.	Propylthiouracil 400 mg. daily and desiccated thyroid 0.2 gm. daily for 9 months. Clinically patient's eyes were worse with treatment.	OS 26 mm. OD 28 mm.
Primary hyperthyroidism	OS 25 mm. OD 26 mm.	Methylthiouracil 300 mg. daily for 1 month. No change in measurements during 12-month period. Received desiccated thyroid 0.2 gm. daily during most of that time. Subjectively, felt improved.	OS 26 mm. OD 26.5 mm.

TABLE 5.—Data on Three Women Treated with Antithyroid Drugs During Pregnancy

Case	Age	Clinical Data	Course
1.	26	Past history of advanced pulmonary tuberculosis. Hyperthyroidism had been treated with propylthiouracil for 7 months; was on dose of 50 mg. daily when became pregnant.	Third month of pregnancy blood iodine rose from 4.4 micrograms to 10.2 micrograms per 100 cc. Propylthiouracil dose increased to 150 mg. daily; blood iodine maintained between 7 and 8 micrograms per 100 cc. After 9 months of treatment, delivered normal baby. Blood iodine fell to 3.2 micrograms per 100 cc. after delivery.
2.	23	Hyperthyroidism diagnosed Sept. 1947. Treatment with propylthiouracil. Became pregnant Aug. 1948 when was receiving 150 mg. daily of propylthiouracil.	Blood iodine rose from 7.7 micrograms per 100 cc. to as high as 13 micrograms without clinical toxicity, during pregnancy. Normal baby delivered April 30, 1949.
3.	33	Hyperthyroidism diagnosed Nov. 1948. Methylthiouracil 400 mg. daily Nov. 1948 to May 1949, 100 mg. daily to June 8, 1949. Became pregnant Jan. 1949.	Blood iodine maintained between 3 and 4 micrograms per 100 cc. during pregnancy. Spontaneous abortion at 6 months.

The third patient, with history of previous miscarriage, was kept in a state of mild hypothyroidism and spontaneous abortion occurred at six months. Autopsy of the fetus was not carried out.

Antithyroid drugs should be given in low enough dosage to permit the basal metabolic rate or protein-bound iodine to rise during pregnancy. Instead of keeping the protein-bound iodine at levels of 3 to 4 micrograms per 100 cc. of serum, it should be permitted to rise to levels of 8 to 10 micrograms per 100 cc.

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The Nutritional Status of the Aging Public Health Aspects

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SUMMARY

In preliminary analysis of nutritional, physical and laboratory data obtained in a study of 577 persons 50 years of age and over in San Mateo County, a number of factors of possible significance were noted.

Of the 577 persons examined, 243 were referred to private physicians for a total of 377 conditions requiring attention.

Obesity and hypertension were the most common causes for referral. More women than men were overweight. Anemia was noted more often in women than in men. Serious anemia was of higher incidence in the higher age brackets. In a number of cases in which there was high glucose content in the blood there was no trace of sugar in the urine.

Abnormally low content of ascorbic acid in the blood was of high incidence among persons of low income, of lesser incidence in the middle income group, and did not occur in persons in the high income group.

THERE is obvious need for research in the field of human nutrition in our aging population, since this group is ever increasing in the total population. Very little is known of the physiological mechanisms involved in the aging process nor is it clearly understood what is meant by pathological changes in contrast to the so-called inevitable normal involutionary changes. Certainly, it may be hoped that as new scientific facts are gathered people may not only lead a longer, but also a more functionally active and socially useful life.

Available scientific evidence suggests that dietary inadequacies and malnutrition of varying degrees are of frequent occurrence in the United States and that the nutritional status of an appreciable part of the population can be distinctly improved. Animal experimentation indicates that length of life, as well as functional efficiency, can be considerably enhanced by more adequate nutrition. To promote optimum human nutrition and health more scientific knowledge is required regarding the nutritional needs of and the nature of the characteristic changes in the aging.

From the San Mateo County Department of Public Health and Welfare.

Presented before the Section on Public Health at the 79th Annual Session of the California Medical Association, April 30-May 3, 1951, San Diego.

This presentation is a preliminary report on a joint cooperative research project* carried out in San Mateo County during the year 1948-49 by the U. S. Bureau of Human Nutrition and Home Economics, the U.S.P.H.S., the Department of Home Economics of the College of Agriculture of the University of California, the California State Department of Public Health, and the Department of Public Health and Welfare of San Mateo County, with the cooperation of the San Mateo County Medical Society.

Objectives: The Western Agricultural Experiment Stations, the U. S. Bureau of Human Nutrition and Home Economics and the United States Public Health Service have established long-term objectives for a five-year study of human nutrition, of which the present study was only one phase. The immediate local objectives were fivefold:

1. To collect information on etiologic aspects and the prevalence of deficiency and degenerative diseases in the aging in San Mateo County.
2. To determine the relationship between nutritional status and the degenerative diseases of the aging.
3. To test, develop and apply methods of assessing human nutrition and health status in the aging.
4. To develop procedures effective in the correction of nutritional deficiencies and other diseases discovered by the health appraisal.
5. To present to the physicians and the community at large information regarding nutrition in the aging.

With the nearly total lack of knowledge regarding nutrition in the aging and such broad objectives, it is obvious that the techniques used were necessarily of the shotgun variety—that is, instead of a study of any one nutritional factor exhaustively, a very broad approach was made to the problem in hopes that later statistical analyses would reveal certain clues or correlations worthy of more detailed study.

The procedure was as follows:

1. Recruitment and selection of persons for study.
2. Examination, including detailed nutritional and medical history, physical examination, and laboratory studies.

*Although each of the agencies made contributions to the project in either kind of service, the principal source of support came from an annual \$40,000 grant made by Congress to the eleven Agricultural Experiment Stations of Western States for research in human nutrition. As this was a research project and not an administrative or case-finding study, no attempt has been made to determine the actual case costs; but for known cash outlays it averaged about \$110 per case completed.

3. Referral to private physicians of persons with detected abnormalities.

4. Tabulation and analysis of data.

Recruitment and Selection. As all persons studied were volunteers, a publicity campaign was conducted to reach the population in the age groups under study, with the close cooperation of the press, radio, voluntary health agencies, churches, labor organizations, lodges, luncheon clubs and other social organizations. All persons selected for study were 50 years of age or over, were residents of San Mateo County, were physically and mentally capable of participating, were not on any special diet, and had not been under the care of a private physician within the previous three months.

Eight hundred and forty-three persons registered; studies were completed on 577 persons selected from the registrants. Although the sample was random in order to facilitate statistical analyses, efforts were made to obtain:

1. An equal number of males and females (final count 280 males and 297 females).

2. As nearly as possible an equal number of participants from each age group. This was impossible, the final distribution being as follows:

Age Group (years)	Number	Percentage of Total
50-59.....	192	33.2
60-69.....	215	37.3
70-79.....	137	23.8
80-89.....	33	5.7

3. A sample from all economic groups. The distribution was as follows: County institution, 47; low economic, 59; middle economic, 445; upper economic, 24; unknown, 2.

4. A reasonable geographic distribution. In addition to the participants examined at the Crystal Springs Home, the unit was stationed during different periods of the study in the far north of the county (Daly City), in the central part of the county (Burlingame), and in the southern part of the county (Redwood City). The distribution of participants by area was as follows: Crystal Springs Home, 48; Daly City, 72; Burlingame, 311; Redwood City, 146.

Examinations.

1. Nutritional history was divided in two parts:

Part A was a seven-day record kept by the participant of everything he ate after a detailed conference with the nutritionist.

Part B was a general food history elicited by the nutritionist covering the participant's general food habits over the years.

2. Medical history was also done in two parts:

Part A was a general medical history of the patient's previous diseases and medical care.

Part B was a detailed history relative to physiologic systems.

3. The physical examination consisted of the procedures followed in the usual careful clinical examination plus an assessment of nutritional status by

physical signs, as outlined in the Manual for Nutritional Appraisal of the United States Public Health Service.

4. The laboratory procedures consisted of the following determinations:

- (a) Blood—Hemoglobin, serum protein, sedimentation rate, packed red cell volume, glucose, ascorbic acid, Vitamin A, carotene, non-protein nitrogen, cholesterol (free), cholesterol total, leukocyte count with cell differential, erythrocyte count, and tests for presence of organisms.
- (b) Urine—glucose, albumin.
- (c) Chest x-ray.
- (d) Bone density determination (Method of Dr. P. B. Mack).
- (e) Vaginal Papanicolaou smears for women.

Referral to private physicians. As soon as possible after completion of the examinations, a summary was prepared for each patient and a letter sent informing him or her that (1) no conditions were discovered requiring medical care at the time, or (2) that he or she was in need of medical care. If the participant indicated the name of a physician in private practice, a complete summary was sent to the physician, and, if abnormal conditions had been found, the information that the patient was being referred. If no physician was indicated by the participant, he was asked to designate a physician, and a complete summary was sent to the physician indicated. Of the 577 persons examined, 243 (42.1 per cent) were referred to private physicians. Some of those referred had more than one of the conditions requiring the attention of a physician; there were 377 such conditions in the 243 persons referred.

Condition	Number of Instances	Percentage of 377 Instances
Hypertension.....	120	31.8
Obesity.....	101	26.8
Serologic evidence of disease.....	7	1.8
Cardiac abnormality.....	17	4.5
Anemia.....	14	3.7
Hyperglycemia.....	14	3.7
Albuminuria.....	29	7.7
Glycosuria.....	17	4.5
Cervical polyps.....	5	1.3
Cervical erosion.....	6	1.6
Other.....	47	12.5

In the 297 women examined, no case of malignant disease was detected by the Papanicolaou test. No case of tuberculosis was detected in the 577 chest x-rays.

As hypertension and obesity were by far the most common causes for referral, a simple association table was compiled (Table 1).

Of the males, 13.6 per cent were overweight, while 16 per cent of the females were overweight—not a significant difference, but suggestive. Of persons under 65 years of age, 17.5 per cent were overweight while 12.1 per cent of those over 65 were overweight. This might suggest that perhaps those in the older age brackets who are overweight do not live into the 65 plus age group.

TABLE 1.—Incidence of Overweight and of Abnormally High Systolic Blood Pressure

Sex:	O.W. [†]	—O.W. [‡]	Total
Male.....	37 (13.6%)	234	271
Female.....	47 (16%)	246	293
Total.....	84 (14.9%)	480	564*
Age:			
65—.....	51 (17.5%)	240	291
65+.....	33 (12.1%)	240	273
Total.....	84 (14.9%)	480	564*
Systolic blood pressure (mm. of mercury):			
200+.....	20 (26.3%)	56	76
200—.....	64 (13.1%)	424	488
Total.....	84 (15.9%)	480	564*

[†]O.W. = Overweight—16 per cent or more above calculated average weight for age and sex.

[‡]—O.W. = Not overweight.

*Data not complete on 13 participants.

Obesity and hypertension were definitely associated, as would be expected. Of the overweight participants, 23.8 per cent had a systolic blood pressure of 200 mm. of mercury or more, while only 11.6 per cent of those who were not overweight had systolic pressure of that order.

There was little difference between the males and females as to hemoglobin content of the blood, but the incidence of anemia was slightly higher in females than in males. With anemia considered to exist if the hemoglobin content was 11 gm. or less per 100 cc., 2 per cent of the females and 1.4 per cent of males were anemic. Serious anemia was more common in the older age groups.

Age Group	% of Participants with Less Than 11.0 gm. Hemoglobin per 100 cc.
50-59.....	1.04
60-69.....	.93
70-79.....	3.15
80-89.....	4.16

The relationships between high content of sugar in the blood and sugar in the urine were of interest. In this regard, any specimen of urine with a trace of glucose or more was considered "positive"; blood containing 160 mg. per 100 cc. within two hours after a meal or as much as 130 mg. more than two hours after a meal was considered "positive." Forty-four persons had urine positive for sugar, and 35 had "positive" blood. Only 31.8 per

cent of those with "positive" urine had "positive" blood, while 3.9 per cent of persons with urine negative had blood positive for sugar. This would indicate that in general surveys for diabetes, determination of the sugar content of the urine is not completely reliable. Of the 35 persons with blood positive for glucose, 21 (60 per cent) had not even a trace of sugar in the urine.

The final phase of this study—tabulation and analysis of the data—is not yet completed. When it is, answers to some of the following questions may be found:

1. Are the accepted "normal ranges" for the various blood constituents valid in the older age groups?
2. What is the relationship between food cholesterol or fat intake and the blood cholesterol level?
3. Is the bone density in old age correlated with calcium/phosphorus intake, sun exposure, Vitamin D intake, protein intake or any other measured factor?
4. Is there a correlation between the intake of protein or other nutrients and blood levels of non-protein nitrogen, uric acid or creatinine.
5. Are any specific dietary elements correlated or associated with kidney disease, hypertension, cardiac disease, other degenerative diseases?
6. What dietary factors are correlated with high or low hemoglobin levels in elderly persons?
7. Do high Vitamin A intake or high ascorbic acid plasma levels favorably affect the health?

In relation to Question 7, some data are now available. The results of the blood analyses for ascorbic acid were analyzed in relation to the economic status of the persons studied (Table 2). Assuming ascorbic acid content below 0.5 mg. per 100 cc. to be abnormal, it was found that 87 per cent of the institutional patients fell in this range, 41.7 per cent of the low economic group in the general population, 20 per cent in the middle economic group and none in the high economic group. There is an apparent correlation between economic status and ascorbic acid blood levels. At the Crystal Springs Home either the food provided for the kitchen does not contain sufficient Vitamin C or else the food is so cooked that part or all of the Vitamin C is destroyed. It might be assumed that those who can afford a good diet naturally include adequate Vitamin C in their diet.

TABLE 2.—Ascorbic Acid Content in Blood of Aged Persons of Various Economic Groups

Blood ascorbic acid mg. per 100 cc.:	Total	Pension and Relief		General Population		
		C.S.H.*	Low	Middle	Low	Middle
0.0 to 0.4.....	166 (28.8%)	41 (87.2%)	12 (52.1%)	14 (31.8%)	15 (41.7%)	82 (20.4%)
0.5 to 0.8.....	128 (22.2%)	3 (6.4%)	4 (17.3%)	10 (22.7%)	15 (41.7%)	93 (23.2%)
0.9 and over.....	274 (47.5%)	1 (2.1%)	7 (30.4%)	19 (43.2%)	6 (16.6%)	221 (55.1%)
Unknown.....	9 (1.5%)	2 (4.3%)	0	1 (2.3%)	0	5 (1.3%)
Total.....	577	47	23	44	36	401
						24

* Crystal Springs Home.

The Refrigeration Treatment of Chronic Osteomyelitis

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SUMMARY

Systemic penicillin therapy plus refrigeration at the site of the lesion, with operation if necessary, was used in the treatment of chronic osteomyelitis.

Nine patients with disease of long standing were treated. For three, bed rest, chemotherapy and refrigeration were sufficient. Surgical treatment in addition was carried out in six cases. Operations consisted of unroofing the abscess cavity, multiple drilling for sieve-like perforation of the abscessed bone, and primary suture of the incision. Solutions of penicillin, 500 to 1,000 units per cubic centimeter, were used for local irrigation at the time of closure.

In all cases the lesions healed and there was no recurrence within a period of two years. The period of hospitalization did not exceed 14 days in any case.

Refrigeration of the infected area before and after operation reduced pain, swelling, infection and toxemia.

TEN years ago, with the widespread use of the sulfonamide drugs, the mortality rate of acute osteomyelitis fell sharply to approximately 4 per cent, and the morbidity of chronic osteomyelitis as a complication of other injuries became correspondingly low. Since then, with the use of penicillin, the mortality rate of acute and chronic osteomyelitis has approached zero. Yet the occasional case of chronic or recurrent osteomyelitis of many years' standing is still a difficult surgical problem. Occasionally a new case of acute osteomyelitis will become chronic and necessitate surgical treatment despite the best of medical management.

Patients with acute osteomyelitis can be divided into two groups. First, those with primary acute osteomyelitis of metastatic hematogenous type in which an acute lesion appears, usually in a long bone. Most such patients are children. Occasionally there is a history of trauma or of mild infection elsewhere in the body—an upper respiratory infection, pimple or boil, or a small open wound. Since the advent of penicillin therapy, the management of cases of this type has become fairly well standardized—complete bed rest, immobilization of the soft tissue and joints of the affected limb, administration of penicillin to a high blood level, and occasionally in addition a sulfonamide drug by mouth. The lesion usually disappears in three to ten days. The addition of local refrigeration therapy to the site of infection has been reported to materially reduce

the pain, local swelling, duration of symptoms, and length of hospitalization.² In a small number of cases a localized abscess will form, occasionally containing infected fluid, although frequently the fluid is sterile owing to chemotherapy; and in such cases surgical incision and drainage or aspiration will be necessary. The injection of a local solution of penicillin into the abscess or infected joint cavity will materially reduce the extent of the local infection.

The second group of patients are those with acute osteomyelitis following infection of a compound fracture or an operation on a bone or joint. Such cases are rarer than in previous years but they will still occur as long as people have compound fractures and as long as surgical operations are done on bones and joints. The local use of penicillin solution, 500 to 1,000 units per cc., in the irrigation of compound fracture wounds during debridement, or in orthopedic surgical wounds before closure, will greatly reduce the incidence of bone infection.

In a series of 276 cases, including both compound fractures and operations on the bones and joints, acute infection occurred in only one case in which local irrigation of penicillin solution was used. In that case, suppuration developed approximately six weeks after operation for spinal fusion. After removal of a single bone chip, which had become infected and formed a sequestrum, prompt healing occurred. In cases of this type, local refrigeration of the affected part will materially reduce the pain, swelling, and the incidence of wound and bone infections.

Schaubel³ reported the use of refrigeration after orthopedic operations in 345 cases. He stated that the amount of narcotic necessary to relieve pain was greatly reduced, and that there was less pain and discomfort, less swelling, less occasion for post-operative casts and dressings to be loosened, and fewer postoperative complications. Gilbert, Call, and Roose³ used refrigeration and penicillin not only for wounds of the extremities but also in cases of epidermophytosis and varicose ulcers with extremely good therapeutic effect.

CHRONIC OSTEOMYELITIS

The cases of chronic osteomyelitis reported upon in this presentation were of two classes:

1. Those in which the bone remained infected over a period of many years, with periodic acute flare-ups with pain, swelling, and occasional drainage or extrusion of a sequestrum.

2. More recent cases of chronic osteomyelitis, usually following infection of a wound or operative site.

The term "osteomyelitis" as here used conforms with the American usage of the word, by which is meant any infection of the bone and adjacent tissues. It would be more correct to use the term

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"ostitis" as meaning acute or chronic infection of bone tissue. This is the general term which includes both the conditions known as "osteomyelitis," which means inflammation of the bone marrow, and "periostitis," which means the inflammation of the periosteum and infection of the external surface of the bone.

The new techniques for the management of cases of chronic osteomyelitis described here do not in any way supplant the previous principles. Rather, they supplement the principles of good operative treatment of disease of the bones. The techniques for successful management of a case of chronic osteomyelitis can be divided into five phases, several of which are carried on simultaneously:

1. Rest and immobilization. The famous English orthopedist, Hugh Owen Thomas, was the first to insist on absolute rest and immobilization in treatment of infection of bones and joints. He used bed rest and secured immobilization by carefully made braces, splints, and bandages. A student of his, John Ridlon of Chicago, was in turn the teacher of Orr, who introduced the plaster cast and infrequent dressing method of treating chronic osteomyelitis.⁸ Orr's method was further elaborated and applied in the Spanish civil war by Trueta.¹⁰ In Orr's and Trueta's experience, open drainage of the wound, packing with petrolatum gauze loosely, and immobilization with plaster of paris splints and casts prevented the inspread of infection and toxemia and reduced the amount of edema and swelling and the general toxic reaction of the patient. Although the author feels that plaster casts are not necessary, absolute bed rest, elevation of the infected extremity and immobilization of the joints by splints during the active stage of infection are recommended.

2. Chemotherapy. The Carrel-Dakin method of irrigation of osteomyelitis lesions by dilute chlorine solution, the maggot treatment, and the sulfonamide treatment have been discarded in favor of penicillin therapy. Penicillin should be given in adequate dosage and for several days after disappearance of the last clinical evidence of infection. Now that the more slowly absorbing suspensions and emulsions of penicillin are available, 300,000 or 400,000 units, given twice a day intramuscularly, is considered adequate. The penicillin is usually continued for five to twenty days from the beginning of treatment. For children under 12 years of age the dose is decreased in proportion. If the organism can be isolated by culture of the blood or material from local drainage or abscess, it should be tested to determine if it is penicillin-sensitive.

3. Refrigeration. Allen and Crossman¹ (cited by Matthews and Hutter⁷) first introduced refrigeration in surgical treatment ten years ago. The use of refrigeration to produce anesthesia and to reduce the amount of septicemia and infection and gangrene of the extremities is well known. In the South Pacific during the recent war it was found to be useful in controlling infections in battle wounds and infections of the extremities which were slow or

resistant to healing in the high temperatures of the tropics. In many cases of badly damaged and infected limbs, some with considerable circulatory impairment, this method was used. The local infection was reduced, the systemic reactions to the infections decreased, and the circulation restored in the limbs in many cases in which otherwise amputation would have been necessary.

Technique. A small lesion can be covered with one or two ice caps placed over a moist towel next to the skin. A very acute and large lesion can be covered with one or two layers of moist toweling, with crushed ice applied directly over the towel. This is kept constantly in place for from five to fourteen days, or until evidence of local infection and inflammation has subsided.

The rationale for the use of refrigeration in chronic osteomyelitis is as follows: Bacteria multiply rapidly at body temperatures or higher, but at greatly reduced rates at low temperatures. The human extremities can tolerate 57° F. applied to the toes and fingers, 36° to 38° F. applied to the calf and upper extremities, and 32° F. applied to the thigh. Thus the body tissues can be cooled to temperatures at which bacteria multiply slowly but the tissues are not injured. The general temperature of the body is also lowered to a slight degree by local refrigeration, a beneficial factor in cases in which the patient has fever from the systemic effect of the local osteomyelitis. At the site of infection, cooling of the tissues seems to reduce the multiplication of the bacteria and increase the effect of penicillin. The circulation of the blood brings a constantly replenished supply of leukocytes and a fresh supply of penicillin to combat the infection. As a result the osteomyelitic lesion becomes more localized and smaller each day, and the virulence and toxicity of the infection is greatly lessened.

Refrigeration is begun as soon as the diagnosis of osteomyelitis can be made. The ice is again applied above the surgical dressings after operation and refrigeration is continued for three to five days, or until the patient's temperature is normal and the wound appears to be healing well. The ice is removed once or twice during the day for an hour for observation of the character of the circulation in the limb and the extent of the infection. The temperature of the skin at the site of infection always is much higher than that of the skin in the surrounding area. If the skin over the lesion does not become warmer than that of the opposite normal limb when the pack has been removed for an hour, refrigeration is discontinued.

4. Surgical drainage of the abscess and removal of sequestrum. In many cases, rest and immobilization, chemotherapy, and refrigeration may cause the infection to subside or to disappear completely. In other cases an abscess will form and become localized and fluctuant under the skin. In that event, all that is necessary is a short incision or a needle aspiration to remove the accumulated fluid. Very often cultures of this fluid will be sterile and patho-

logical examination will show only tissue necrosis and phagocytosis. In a few cases a definite sequestrum will form. This can be removed at the time the abscess is drained, and healing then usually is rapid and spontaneous.

5. Surgical obliteration of the abscess cavity and primary closure. In some cases of osteomyelitis there will be an intramedullary bone abscess which cannot spontaneously drain to the surface of the limb. In such cases penicillin may seem ineffectual because the blood stream in which it is carried does not reach the walled-off abscess. Often in these circumstances the patient has great pain owing to the amount of local swelling of the abscess under the periosteum. The infection may be observed to spread to the cortex of the bone and up and down the marrow cavity for its entire length. In children an abscess may form in the metaphysis and invade the adjacent joint.

In such cases operation is necessary to drain the abscess cavity and break down the wall between normal tissue and the center of the abscess. This is done after a 24- to 48-hour preliminary period of chemotherapy and refrigeration. The patient is prepared and draped in the usual manner in the operating room and an incision is made down to the bone. The periosteum is elevated and drill holes are made through the cortex toward the abscess until the central cavity, identified by pus exuding from the hole when the drill is removed, is located. The roof of the abscess is then removed completely with a rongeur or gouge and mallet. The interior of the abscess is thoroughly curetted and irrigated with copious quantities of penicillin solution containing 500 or 1,000 units per cc. The wall of the abscess cavity is usually sclerotic and densely calcified. With an electric bone drill, multiple holes are made in the base, both sides, and the top and the bottom of the abscess cavity until it resembles a sieve. In this way channels are opened up both for drainage and for invasion of granulation tissue and capillaries from the adjacent normal tissue into the center of the former abscess cavity. The wound is again irrigated with penicillin solution and the soft tissue brought together; as much of the abscess cavity as possible is obliterated by turning in muscle and soft tissue during the closure. Fine chromic catgut interrupted sutures are used for closing the wound in layers without tension. The skin is closed with a continuous cotton or dermal lockstitch and a padded pressure dressing is applied.

The patient is returned to the ward and ice bags are placed over the dressings on the limb and above the operative site. Refrigeration is continued for approximately five days and penicillin for seven to ten days. At the end of this time the wound is usually well healed and the temperature is normal. The sutures then can be removed and the patient can be permitted to walk with crutches without full weight bearing. Roentgenograms are made at monthly intervals, and weight bearing is permitted when the bone appears sufficiently healed and strong.

In the past four years in the Riverside Community and Riverside County hospitals, nine cases of chronic osteomyelitis have been treated by this method. The youngest patient was four years of age, the oldest 90. Four were women and five were boys and men. The duration of the infection before treatment varied from two to eighteen years; the average was four years. Three patients had infection of the femur, and the others had, respectively, infection of the humerus, ulna, tibia, metatarsal, phalangeal toe and ankle bone. On admission to the hospital they had temperatures varying from 101° to 106° F.; the average was about 103° F. In those cases in which operation was done, it was carried out on the second to fifth day after admission, and penicillin and refrigeration were used both preoperatively and postoperatively. In three cases operation was not necessary; the lesions healed with rest, chemotherapy, and refrigeration. In one case healing followed incision and drainage of the abscess. Open surgical procedures, with unroofing of the abscess cavity, were carried out in five cases. In one case a sequestrum was removed. Multiple drilling of the bone with "sieve" technique was done in three cases. Primary closure was done in all cases, and in all there was healing without recurrence of symptoms.⁴ None of the patients died. The average hospitalization was 14 days. One patient was given sulfadiazine as well as penicillin, as recommended by Matthews and Hutter.⁷ The others received penicillin only, averaging 300,000 to 400,000 units a day for ten days. The average total amount of penicillin given was 3,600,000 units. Refrigeration was used in all cases. The length of time it was continued ranged from four days to 11 days; the average was seven days. All the patients were followed for at least two years and none had recurrence within that time.

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A Review of the Literature on the Etiology of Hodgkin's Disease

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SUMMARY

Extensive research to trace the cause of Hodgkin's disease to a bacterial or protozoan agent has proven fruitless.

Although a viral cause for Hodgkin's disease has been previously suggested, early explorations along that line have not been confirmed. With the development of newer techniques for the study of viral characteristics certain apparently significant factors in Hodgkin's disease have been encountered. Most promising has been the consistent demonstration that Seitz-filtered, sterile Hodgkin's disease lymph node extract can be passed serially in fertile chicken eggs and that the amniotic fluid from these eggs possesses the capacity to interfere with the growth of influenza virus in eggs.

IT is possible to review the literature on the cause of Hodgkin's disease even though no cause has ever been generally accepted as being valid. This paradox exists because many so-called "causes" of Hodgkin's disease have been announced or strongly implied in the literature. Each of these has been followed by a rash of clinical trials of different substances supposed to neutralize or control the so-called etiological agent, and finally further experimental and therapeutic studies (Tables 1 and 2) have given general discredit to the whole announcement.

This cycle of events has occurred so repeatedly in the case of Hodgkin's disease that a review of this phenomenon is interesting. In addition there is possibility that a small thread of truth and reason may be tangled in the maze of generally unacceptable etiologic announcements.

In general the clinical impression in Hodgkin's disease is one of a toxic or septic process coincident with recurrently enlarging lymph node tumor masses. That this frequent association of the disease with fever and toxicity has had its effect on etiologic thinking is seen in the fact that, when a specific cause has been postulated, it has almost invariably been on the basis of a supposed microbiologic organism. Hodgkin himself confused the disease with tuberculosis, and Sternberg²⁴ for a long time

felt that it was a peculiar form of tuberculosis. Later he agreed with Reed²⁰ that it was a separate entity from tuberculosis, although often associated with it, and probably itself essentially inflammatory in origin.

The possibility that Hodgkin's disease was related to tuberculosis remained in the minds of many workers, since it is known that in from 10 to 20 per cent of cases there is evidence of either inactive or active tuberculosis at autopsy. Furthermore, the negative tuberculin reaction in patients with Hodgkin's disease was so frequent as compared to negative reaction in many other diseases (Steiner²³) that students could not avoid thinking of Hodgkin's disease as being perhaps an anergic phase of tuberculosis. Fraenkel and Much⁹ and Ewing⁶ were impressed with this apparent relationship and reported finding acid-fast rods and granules on occasion in tissue from patients who had Hodgkin's disease. In general, however, animal inoculations with such material did not produce the disease. L'Esperance¹⁵ reawakened the tuberculosis theories when she postulated that the bacillus involved was of the avian strain. Although she reported producing tuberculosis in chickens by intravenous injection of ground lymph nodes from subjects with Hodgkin's disease, this was not a constant finding. Subsequent experimenters (Van Rooyen²⁷) were unable to confirm these findings, and in general the entire concept was abandoned.

The general significance of the diphtheroid bacilli in Hodgkin's disease was first postulated (erroneously) by Bunting and Yates.⁴ They cultured Hodgkin's disease lymph nodes in a search for an etiologic agent and isolated a diphtheroid bacillus on several occasions. They injected this organism subcutaneously into monkeys and regional lymph node disease resulted. Although the animals were toxic and the nodes frequently necrotic, the investigators nonetheless concluded that the bacillus caused a reaction "unquestionably related to human Hodgkin's disease." Subsequently many other investigators, including Fox,⁸ demonstrated that such diphtheroids could be isolated from many types of human lymph node tissues. It was soon recognized that the reaction produced in monkeys was simply inflammatory lymphadenopathy.

Parsons and Poston¹⁹ called attention to the simultaneous existence of Hodgkin's disease and brucella infections in their material. They isolated brucella from the lymph nodes in 14 consecutive cases of Hodgkin's disease (Wise and Poston²⁸) and stated that the pathologic change in the glandular type of

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TABLE 1.—*Supposed "Etiologic Organisms" in Hodgkin's Disease*

Organism	Investigators and Date	Basis of Postulation	Evidence Against
Human tubercle bacillus	Sternberg (1898)	Similar in appearance, occasional association.	Animal inoculations negative.
Avian tubercle bacillus	L'Esperance (1931)	Tubercle bacillus in some chickens after intravenous injection of ground Hodgkin's disease nodes.	Van Rooyen (1933) inoculated chickens, with negative results.
Diphtheroids	Bunting & Yates (1914)	Isolated from Hodgkin's disease, lymph nodes; injected in monkeys, caused Hodgkin's disease.	Often found in any lymph nodes (Stewart, 1932). Did not cause Hodgkin's disease in monkeys (Fox 1915).
Ameba	Kofoid	Found ameba in lymph nodes in Hodgkin's disease.	Never confirmed. He mistook macrophages for ameba.
Brucella	Parsons & Poston (1939)	Frequently finding Brucella in lymph nodes in Hodgkin's disease.	Findings not confirmed in other part of U.S.A. (Hoster, Doan et al. 1944). It is an endemic disease in South.
Virus	Gordon (1932) Grand (1942) Bostick (1947) Bostick (1949)	Inclusion bodies. Inclusion bodies. Lethal factor for eggs. Virus interference phenomenon.	Never started Koch's postulates. No epidemiological evidence. Human inoculation unsuccessful.
Torula histoplasmosis, bacilli and cocci. Monilia, gas bacilli, yeasts	Various authors	Sometimes associated with Hodgkin's disease.	Not proposed as "cause"—only as a "trigger mechanism."

brucellosis could not be distinguished microscopically from those caused by Hodgkin's disease. Even with brucella infections patients with Hodgkin's disease often showed no or minimal reaction to the organisms as judged by immunological techniques. Experiments by the other investigators designed to confirm these findings were essentially unsuccessful. Hostler, Doan and Schumacher¹² cultured tissue from 45 cases of Hodgkin's disease and were unable to demonstrate brucella organisms. Further investigation revealed that brucellosis is an endemic infection in the southern area, where Parsons and Poston worked.

Several investigators have been impressed by the diversity of the types of microorganisms which have been found in lymph nodes affected by Hodgkin's disease. Billings and Rosenow¹ concluded that in the early phases of the disease bacilli predominate in the nodes, whereas in the later stages the cocci gain ascendancy. Twort²⁶ found many types of bacteria in cultures of lymph node tissue from subjects with Hodgkin's disease. Jackson and Parker¹⁴ even found in many affected nodes a Gram-positive anaerobic gas bacillus, but the organism was also observed in some control lymph nodes. Yeasts have been isolated from about 55 per cent of lymph nodes, both in controls and those affected by Hodgkin's disease. Torulosis has been associated with Hodgkin's disease (Fitchett and Weidman⁷). Miller, Keddie, Johnstone and Bostick¹⁸ noted the pronounced histologic similarity and coincidence of Hodgkin's disease and histoplasma capsulatum infections.

This multiplicity of organisms that have been encountered in Hodgkin's disease has induced several investigators to suggest, as did Desjardins,⁵ that "the factor immediately responsible for lymph-

oblastomatous hyperplasia of the lymphoid structures is chronic infection of any kind." Fitchett and Weidman⁷ considered this to be a possibility. It is known that occasionally Hodgkin's disease develops in a patient after many years of lymphadenopathy. Often in such cases there is history of recurrent transient swelling of lymph nodes, apparently bacterial in origin, and hypertrophied tonsils. Whether or not such a "trigger" action of chronic non-specific bacterial lymphadenitis exists in certain predisposed patients is not known, although it is neither impossible nor unreasonable.

Bacterial and animal inoculation studies (Table 2) of the Hodgkin's disease process did little to clarify the problem and search for a viral agent developed. Gordon¹⁰ and his associates made the first systematic investigation in this regard, although earlier investigators (Twort²⁶ and McJunkin¹⁶) and many later ones concluded that viral infection would offer a logical explanation of the whole process. These conclusions were based upon theoretical considerations reached in the light of known clinical, pathological and experimental characteristics of Hodgkin's disease, which at times possess a resemblance to characteristics of certain known viral tumors of animals.

Gordon's investigation of Hodgkin's disease consisted of a broad study of the effect of the inoculation of various animals—including monkeys, mice, guinea pigs and rabbits—with ground tissue from subjects with Hodgkin's disease. Results of all the procedures were essentially negative except for the observation that, in rabbits, intracerebral inoculations resulted in the development of an encephalitis and convulsive syndrome which developed in from two to six days after incubation. This reaction occurred in from 60 to 75 per cent of cases in which

TABLE 2.—*Hodgkin's Disease Treatment with Biological Preparations*

Authors	Material	Results
Billings & Rosenow (1913)	Diphtheroid vaccine.	Unsuccessful.
Moore (1916)	Diphtheroid vaccine made in horses.	Not successful.
Coley (1928)	Prodigiosus and streptococcus toxins.	Poor.
Utz & Keatings (1932)	Chickens immunized with Hodgkin's disease serum.	Authors: "Encouraging." Others: "Negative."
Gordon (1932)	"Sensitized vaccine" against "virus inclusion bodies." Rabbits used.	Unsatisfactory.
Parsons & Poston (1939)	Brucella vaccine to build up titre in patient.	Not successful.

TABLE 3.—*Animals Inoculated with Lymph Node Mash Derived from Subjects with Hodgkin's Disease*

Animal	Author	Means of Inoculation*	Duration	Results
Chickens	L'Esperance (1931)	I.V.	1 to 10 months	Apparent tubercle bacillus developed in some.
Chickens, guinea pigs, rabbits, dogs, mice	Steiner (1934)	I.V., I.P., I.C., S.C.	Negative.
Guinea pigs	Forbes & Gunther (1941)	I.P.	Variable	No specific lesions.
Guinea pigs, mice, rabbits, rats	Twort (1930)	I.P., Brain, S.C., Nasal, Oral	Months	Negative, except rare guinea pig skin reaction.
Guinea pigs, rabbits	McGrath (1933)	S.C., I.V., I.C., I.P.	Negative, except rare guinea pig skin reaction.
Monkeys	Bunting & Yates (1914)	S.C. and into tonsil area	1 to 3 months	Lymph node which histologically "leaves no question as to the relation to human Hodgkin's disease."
Monkey	McGrath (1933)	S.C., I.V., I.P.	Negative.
Rabbit	Gordon (1932)	All routes	Variable	Negative. "Gordon test."
Man	Tysser (1916)	S.C.	Weeks	No tumors resulted.

*Key to abbreviations: I.V.—Intravenous; I.P.—Intraperitoneal; I.C.—Intracerebral; S.C.—Subcutaneous.

the inoculation material was prepared from nodes from Hodgkin's disease patients and in only about 2 per cent of cases when "control" lymph nodes were used. In the rabbits the microscopic changes were non-specific, and the reaction could not be transmitted to a second rabbit. Guinea pigs were later found to respond in a similar manner.

The encephalitogenic agent remained potent for up to two years, withstood 65° C. but not 70° C. for 30 minutes, and was filterable. These observations of Gordon were confirmed, but the same reactions were produced by inoculation with preparations made from other tissues, especially normal human bone marrow, spleen and leukocytes. Further search revealed that this encephalitogenic agent had many features in common with the proteolytic enzyme of Jockmann, a substance which was found in many normal tissues and which caused encephalitis in rabbits. Although the parallelism between the Gordon phenomenon and Jockmann proteolytic enzyme was not complete, it was sufficient to warrant the conclusion that they are essentially similar substances. A further correlation was made with eosinophilia, so frequently found in lymph nodes of patients with Hodgkin's disease. Turner, Jackson

and Parker²⁵ were able to correlate the presence of these cells with the occurrence of a positive reaction to the Gordon test, and McNaught¹⁷ concluded that the Gordon test was essentially a test for the presence of eosinophils in the tissues.

Gordon also reported the presence of elementary bodies in suspensions of Hodgkin's disease lymph nodes which bore a striking morphologic resemblance to the elementary bodies of vaccinia and psittacosis. He was not able to establish any specific characteristics of the bodies which he observed and photographed. He prepared a "sensitized vaccine" to these particles, but therapeutic use of it was unsuccessful. Grand¹¹ reinvestigated the apparent elementary bodies in Hodgkin's disease by the use of tissue culture techniques. He reported that Hodgkin's disease tissue contained specific cell inclusions and that the addition of acellular Hodgkin's disease extracts to tissue culture of chorio-allantoic membranes of chicken eggs caused those specific inclusions to appear in the cultures.

Hoster and co-workers¹³ partially repeated Grand's work but were not able to confirm his findings, and they remarked that inclusion bodies occurred in many apparently normal chicken membrane tissues.

Rottino and co-workers²¹ also concluded that the changes were non-specific.

A thorough study of Hodgkin's disease extracts by employing the technique of fertile chicken egg passage was made by Bostick.² In early investigations it was demonstrated that sterile, Seitz-filtered amniotic fluid from Hodgkin's disease-inoculated eggs was lethal to chicken embryo in a greater percentage of instances than was control amniotic fluid. Evidence for the presence of this filterable factor was sought by many accepted procedures in virology and immunology.

Hemagglutination techniques, animal injections, cutaneous sensitivity, flocculation and precipitin tests were surveyed without significant results (Bostick³). Attention was then directed toward the capacity of this factor to interfere with the growth of known viruses in chicken eggs.

The virus interference studies encompassed a survey of many viruses. However, the most promising results were apparent initially with influenza A virus. After seven days of initial incubation, the eggs were inoculated with Hodgkin's disease amniotic fluid derived from other egg passages. After three days of further incubation, the challenging virus, influenza, was introduced. After 18 hours of incubation the amniotic fluid of all eggs was harvested and titrated for the amount of influenza in them. This titre was determined by means of the hemagglutination technique of Salk,²² which is based upon the fact that influenza virus is capable of hemagglutinating human erythrocytes essentially in proportion to the amount of virus present.

The Hodgkin's disease material derived from 12 separate patients interfered with the growth of influenza virus. Parallel control material showed no such capacity. This property of extracts of ground Hodgkin's disease material was retained even after 10 to 15 serial passages in fertile chicken egg amniotic sacs and after Seitz filtering. Thus, many of the characteristics of a virus are possessed by this factor, which may also be the same factor which produces the slight lethal effect on the chicken embryos. In the Hodgkin's disease-inoculated embryos no gross or microscopic evidence of pathologic change was observed. These data strongly support a postulation that there is consistently in Hodgkin's disease tissues a factor which is not present in normal or carcinomatous tissues. It is most unlikely that this factor is some incidentally isolated agent that may be present in many random lymph nodes, since it was not encountered in the control lymph node tissues. These interference phenomena offer for the first time a practical tool by which Hodgkin's disease can be extensively studied from a promising etiological aspect.

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Common Errors in the Management of Acute Myocardial Infarction

A Critical Analysis of 58 Fatal Cases

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SUMMARY

Three prominent errors were observed in the management of 58 fatal cases of acute myocardial infarction.

Pain was inadequately relieved in over one-third of the patients.

In several other cases rest was inadequate, with attendant complications.

In three cases sudden death was preceded by irregularities of cardiac rhythm which were noted but not treated.

Length of Stay in Hospital Before Death	Number of Patients
1 - 6 hours	10
6 - 24 hours	10
1 - 3 days	14
Up to 1 week	8
Up to 2 weeks	10
Up to 4 weeks	6

DIAGNOSIS

In six cases the diagnosis of acute myocardial infarction was not made until autopsy. In one of these cases, angina was confused with pain from a recent abdominal operation. In another the patient had chronic rheumatic heart disease with mitral stenosis, and the course was typical of congestive failure; although the patient had some angina, it was disregarded. In a third case, in which the diagnosis was "severe angina," the patient died suddenly a few hours after entry; and in another hemiplegia and coma developed at about the probable time of the infarct. In none of these four cases was an electrocardiogram made. In the remaining two cases, symptoms typical of acute myocardial infarction were lacking, and the electrocardiogram pattern did not suggest it. In one of these two, infarction was directly posterior; in the other a right bundle branch block obscured the pattern. In this latter case ambulation was permitted, and in a few days the left ventricle ruptured.

Diagnosis in the rest of the cases in this series was made before or within a few hours after hospital entry.

RELIEF OF PAIN

In all but four of the 58 cases in this series, the patient entered the hospital with some degree of chest discomfort. These 54 patients may be divided into three groups:

- Thirty-one were relieved of chest distress within one and one-half hours after entering the hospital.
- Nine had moderate chest pain (sufficient to cause frequent complaint) for a period of from one and one-half to 36 hours after entry.
- Fourteen had severe chest pain for more than two hours after entry. The nurses' notes described the distress of these 14 patients in terms such as "unbearable," "excruciating," "very severe."

In none of the 23 cases included in Groups B and C did the patient's physician stay with him until the pain was relieved, and only one patient received

THERE are several generally accepted principles in the treatment of acute myocardial infarction. Rest and the relief of pain are unvarying rules, and it is agreed that control of arrhythmias and efforts to combat anoxemia and cardiac failure are often indicated.

In an effort to reduce the death rate from myocardial infarction, it is deemed of interest to survey, especially in relation to these principles, the management of this disease in a private institution where both specialists and general practitioners treat patients.

MATERIAL

This presentation analyzes the methods of management in 58 fatal cases of acute myocardial infarction in a 450-bed private hospital in a period of two and one-half years. The only basis of selection of these cases was that the diagnosis of acute myocardial infarction was unequivocal and verified by characteristic electrocardiographic patterns and/or at autopsy. Autopsy was done in 28 instances. Thirty of the patients were treated by 26 general practitioners, and 28 were treated by 11 internists.

There are 39 males and 19 females in this series, ranging in age from 45 to 82 years, and averaging 63 years. The age distribution and the time elapsed in the hospital before death were as follows:

Age Group	Number of Patients
40 - 50	7
51 - 60	19
61 - 70	18
71 - 80	12
81 - 90	2

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intravenous sedation. In nearly all of these 23 cases some narcotic such as morphine, Demerol,[®] or Dilaudid[®] was given hypodermically within a few minutes after entry. It evidently was assumed, however, that once the narcotic was given the pain would shortly be gone; and often three or four hours elapsed between injections. In several cases the physician followed the order for sedation with the direction "every four hours as needed for pain," thus encouraging disregard of the pain when it persisted.

More than half of the 14 patients in Group C (severe chest pain) had some degree of decreased peripheral vascular supply, and five were in frank shock, but conscious. As these patients were unable to absorb adequately the narcotic deposited in the peripheral tissues, they received little or no relief of pain. Five of the patients in this group died within three hours after entry, 12 within two days. None of the five who died within three hours were relieved of pain before death.

It is a possibility that relief of pain in these cases would have improved the prognosis. Indeed, pain may well have been the cause of death of at least one patient, a 67-year-old man with a long history of hypertension and angina pectoris but no other disease. He entered the hospital four hours after the onset of substernal pain which radiated to the arms and which he described as unbearable. He was in shock, but conscious and alert, and the blood pressure was 80 mm. of mercury systolic and 60 mm. diastolic. Two 10 mg. subcutaneous injections of morphine sulfate did not diminish the pain, and acute pulmonary edema developed three hours after admission to hospital. In another hour the patient died. (In the last half hour he was relieved of pain by intravenous injection of 10 mg. of morphine sulfate.) Autopsy revealed recent coronary occlusion without demonstrable myocardial infarction. The conclusion that pain reflexly produced pulmonary edema, and hence was the primary cause of death, is at least plausible.

Most of the 23 patients with protracted chest pain became progressively weaker and died undramatically. Four died abruptly. Autopsy was done in only one of the four cases; rupture of the left ventricle was noted.

REST

There was a prolonged period of pronounced restlessness in seven cases not included in groups B and C. These patients were given almost no sedation because they complained little of pain. One had frequent nausea and vomiting, and three were repeatedly out of bed. Autopsy in the former case and in one of the latter revealed ventricular rupture (which occurred on the third and sixth days respectively). The remaining three of these seven patients suffered constant anxiety, and two of them died very suddenly. Autopsies were not done.

ARRHYTHMIAS

It is well known that sudden, painless deaths in patients who are apparently improving after acute

myocardial infarctions may be due to ventricular fibrillation, and careful observation will often reveal irregular cardiac rhythm preceding this catastrophe.¹

In this series pronounced irregularity of the pulse was noted in three cases a few hours before abrupt, but painless, death. These patients were improving from moderately severe infarcts, two having entered eight days and one two days previously. Although the nurses had recorded these irregularities, the attending physicians were not informed, and none of these patients received quinidine. At autopsy, done in one case, an infarction limited to the septum was noted.

ABRUPT DEATH

There were twelve other deaths of similar, abrupt nature, but in these cases no irregularities of cardiac rhythm were recorded. These patients were all improving, and most of them had been in the hospital more than four days. Half were observed to die without pain, and the other half, although not observed at death, evidently had no warning, since none of them called a nurse. Autopsy was done in seven cases, and in four a ruptured left ventricle was observed (these were discussed elsewhere in this presentation). In the other three cases, however, there was no rupture or recent extension of the infarct; in two of them there was extensive necrosis in the superior portion of the interventricular septum. Three of these 12 patients, including the two with necrosis in the interventricular septum, were receiving quinidine.

In this group no error is implicit in the management of those patients who did not die of ventricular rupture. However, speculation with regard to paroxysmal arrhythmias, and the possible existence of prodromal irregularity of cardiac rhythm in some of these cases, seems permissible.

ADDITIONAL CASES

There are 18 cases not mentioned in the preceding categories. In those cases the patients became steadily worse, the majority dying with some degree of congestive failure. In each case this was treated adequately by accepted methods.

DICUMAROL

Reports of several large series testify to the efficacy of anticoagulants in reducing the incidence of thromboembolic phenomena in myocardial infarction.

Thirty-nine of the patients in this series did not receive dicumarol, and in one of these cases a cerebral embolus may have been the cause of death. No venous thromboses were observed.

Of the 19 patients who received dicumarol, one had frank hematuria, but in no case was bleeding a factor in the patient's death. Neither emboli nor thromboses occurred in this group.

DISCUSSION

There were three prominent errors in the management of a large proportion of the 58 patients who died of acute myocardial infarction.

First, the cardinal principle of relief of pain was poorly observed in 23 cases; in over one-half of them there was protracted pain of such severity that it might well have played a significant role in the fatal outcome. It is noteworthy that a narcotic was given promptly in nearly all of these cases on the assumption that once the medication was ordered the patient's pain would shortly be abolished. Intravenous sedation was clearly indicated for the several patients who had decreased peripheral vascular supply. Those in this group who were in frank shock might have been brought out of this grave state if the pain had been promptly relieved.

Second, rest was inadequate in several cases. Omission of adequate sedation, presumably because

the patients did not complain of pain, resulted in pronounced restlessness in six cases, in one of which the patient died of a ruptured right ventricle. In another case several days of vomiting were culminated by left ventricular rupture.

Third, three patients in this series had irregular pulse a few hours before sudden, painless death. In each case the nurse who recorded this irregularity did not inform the physician, and quinidine, which might have averted the disaster, was not given.

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The Use of the Benzidine Test for Occult Blood in Abnormal Mammary Secretions

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WHEREVER and whenever breast tumors are discussed the importance of bloody discharge from the nipple is stressed. Bloody discharge usually indicates an intraductal tumor which may or may not be malignant, and it is current opinion that the segment from which the blood comes should be surgically explored.

The discharge from these lesions is not constant. If the blood in the discharge is fresh, the erythrocytes are readily found in the smear, but if the blood in the discharged material is old the erythrocytes have disintegrated and do not appear on the smear. Intraductal debris may also cause secretion of material suggestive of old blood.

Because the presence of blood in the excreted material is an important point in the diagnosis of intraductal tumor, great care should be taken that it not be overlooked if present. The benzidine test is a valuable adjunct to the usual methods of determining the presence or absence of blood in abnormal mammary secretions. In order to be certain of the presence of blood in the discharge, it has been the practice for several years at this clinic to request that the benzidine test for occult blood be used in examining the secretion if erythrocytes are not readily found otherwise. If blood is found to be present by this test, the fact is considered diagnostic of intraductal tumor and exploration is recommended.

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The Establishment and Operation of a Nerve Block Clinic

One Year's Experience at the Los Angeles County Hospital

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SUMMARY

The Anesthesia Department at the Los Angeles County Hospital established a Nerve Block Clinic for the purpose of alleviating pain and providing helpful information for diagnosis in a number of diseases.

During the first year of operation of this Nerve Block Clinic, over one thousand injections were made. The patients who received the injections were referred to the Nerve Block Clinic by staff members who had been apprised of the services offered.

EVER since Halstead in 1885 demonstrated the use of cocaine as a local and topical anesthetic agent in the United States, physicians have been searching for better drugs and more efficient methods to alleviate the pain of surgical procedures and the pain produced by disease and injury. In recent years anesthesiologists have given more and more attention to non-surgical pain as their knowledge of nerve block procedures to alleviate it has increased. In particular this attention has been directed toward the treatment of the painful states of various diseases and trauma. About two years ago the Anesthesia Department of the Los Angeles County Hospital established a diagnostic and therapeutic Nerve Block Clinic. In preliminary consideration of the project, the first and basic requirement, of course, was a suitable room, preferably large enough to permit the treatment of several patients at one time and conveniently accessible to both hospital patients and out-patients. The room should also be in a quiet section of the hospital and, if possible, air-conditioned so that the temperature might be controlled at a constant level. These requirements were readily fulfilled except that air-conditioning was not available. The equipment necessary, in addition to a few pieces of furniture, was that already available to the modern anesthesia department, namely, an operating table, a liberal supply of various-sized needles, syringes, sterilizing solutions, local anesthetic agents, Pentothal®, and apparatus for delivering 100 per cent oxygen under positive pressure. Personnel requirements were met by the acquisition of a nurse whose duties con-

sist of assisting the operator and caring for the equipment.

Once the necessary equipment had been assembled, the next step was the dissemination of information concerning the Nerve Block Clinic. Many physicians are, unfortunately, as yet unaware of the diagnostic and therapeutic services that an anesthesia department may render through such a clinic, so that this step is of vital importance. At the Los Angeles County Hospital this step was completed by three lines of action. First, a memorandum was sent to all department heads, house staff physicians, and the nursing department apprising them of the existence of the Nerve Block Clinic, its location, and a brief summary of the services it offered. Second, a member of the anesthesia service addressed a regular monthly meeting of the house staff, outlining the various types of pain syndromes that are amenable to nerve block therapy and the diagnostic procedures which are available. Third, the members of the anesthesia staff personally contacted all the senior resident physicians in the hospital and informed them of the functions of the Nerve Block Clinic. As a result of these measures, over one hundred patients were observed in consultation during the first month of operation of the Nerve Block Clinic.

The therapeutic procedures undertaken were performed as indicated after noting the referring physician's request, taking a careful history from the patient and completing a careful physical examination. Diagnostic procedures were also completed as requested unless contraindicated. The patient's history relevant to the condition under consideration was recorded along with an accurate summary of the objective signs before and after each nerve block. Subjective reactions of the patient were also noted in the record. The Nerve Block Clinic record of each patient was filed alphabetically so that it will be available for ready reference at each subsequent visit of the patient. A Hollerith punch card was completed for each case for the preparation of numerical statistics. Finally, a consultation report embodying the information noted was placed in each patient's chart. In the majority of cases the nerve blocks were performed by residents in the Anesthesia Department.

Before each nerve block is started, the nature of the nerve block must be explained to the patient and his written consent obtained for the procedure. This written permission is incorporated in the patient's permanent hospital chart. Favorable results from

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any nerve block procedure should never be promised. It should be emphasized to the patient that each nerve block is a therapeutic trial or a diagnostic test. However, the patient should be informed of the probable effect of the block on the pain which he feels or of the diagnostic information the proposed block should reveal. It is important, in addition, that the patient realize that a series of blocks may be necessary to accomplish the desired therapeutic or diagnostic results. One word of caution might well be injected at this point: Nerve block should not be repeated if, during the block or immediately after completion of the block, the condition under treatment is aggravated or the pain more intense. This, of course, does not apply to the momentary paresthesias which are necessarily produced in order to complete certain types of blocks. On the other hand, according to Livingston,¹ intensification of the pain after the effect of the local anesthetic agent has worn off warrants further blocking with the expectation of a better prognosis. It should also be ascertained at this time whether the patient has ever had a reaction to a previous injection of a local anesthetic agent.

There are a number of types of pain which usually can be successfully relieved by nerve block therapy. There are perhaps many more for which nerve blocking has little, if anything, to offer. For the most part, the effect a nerve block may have on pain in any case cannot be determined until a therapeutic trial has been made. Table 1 contains a list of painful syndromes in which nerve block therapy is usually successful.

TABLE 1.—*Pain Syndromes Which Usually Respond to Nerve Block Therapy*

1. Acute thrombophlebitis.
2. Acute herpes zoster.
3. Shoulder pain.
4. Phantom-limb.
5. Phantom-limb pain.
6. Causalgia.
7. Post-traumatic pain syndrome.
8. Postoperative neuritis.
9. Tic douloureux and trigeminal neuralgia.
10. Laryngeal tuberculosis.
11. Angina pectoris.
12. Trigger-point pain.
13. Low back pain.
14. Pain from malignancy (10 to 30 per cent).
15. Pain from peripheral vascular disease.

Table 2 lists some of the conditions in which nerve blocks may be of value from a diagnostic viewpoint.

The majority of patients referred to the Nerve Block Clinic had peripheral vascular disease. As a constant-temperature room was not obtainable, the diagnostic significance of temperature changes in these patients was of little value. However, a large number of these patients had pain to some degree as a result of the disease they had, and in nearly

TABLE 2.—*Diagnostic Nerve Blocking*

1. Peripheral vascular disease.
2. Herniated nucleus pulposa.
3. Low back pain.
4. Value of sympathectomy in hypertensive heart disease.
5. Differentiation of central and peripheral pain mechanisms.

every instance this pain was relieved by blocking the lumbar sympathetic nerves. In addition, an improvement in the color of the skin was frequently observed, and many patients experienced a sense of warmth in the extremity.

Table 3 lists the types of nerve block and the number of times each was performed during a period of nine months.

TABLE 3.—*Nerve Blocks Performed in 1949*

Block	April 1-Dec. 31
Lumbar sympathetic.....	474
Epidural.....	300
Stellate.....	164
Thoracic somatic.....	37
Lumbar somatic.....	20
Spinal (diagnostic).....	19
Suprascapular.....	17
Brachial plexus.....	11
Mandibular.....	5
Cervical plexus (deep).....	4
Thoracic sympathetic.....	3
Intercostal.....	3
Phrenic.....	2
Mental.....	1
Infiltration (headache).....	1
Caudal.....	1
Sciatic.....	1
Pudendal.....	1
Total.....	1,065

At the present, two solutions are in daily use at the Los Angeles County Hospital Nerve Block Clinic: procaine (0.5-2.0 per cent), and pontocaine (0.1-0.2 per cent). The pontocaine solutions have been used in over 500 nerve blocks without a single reaction of any kind being observed. The 0.1 per cent solution of pontocaine blocked the sympathetic nerves effectively, but, in the author's experience, did not completely anesthetize the major somatic nerves. Pontocaine in concentrations of 0.2 per cent was uniformly successful in blocking conduction along the major nerve trunks.

There are several general principles which should be kept in mind with regard to nerve block therapy.

First, the nerve block itself should not cause the patient to experience more pain than he already has.

Second, the block to be performed must not interfere with vital functions already compromised by disease.

Third, careful aspiration must be performed in two or more planes before each injection so that

the anesthetic solution may not be inadvertently injected into the blood stream, or into the pleural or subarachnoid spaces.

Fourth, the label of each solution must be read carefully before the syringe is filled.

And, fifth, no local, topical or regional anesthetic procedure should be undertaken without having ready for immediate use:

1. A syringe with needle attached containing Pentothal® in solution.

2. Equipment suitable for performing artificial respiration with 100 per cent oxygen under positive pressure.

3. Vasopressor drugs such as ephedrine sulfate and Neosynephrin.®

This equipment is absolutely essential for the successful treatment of a convulsive reaction following too rapid absorption of too great a quantity of a local anesthetic agent. The time factor is one of vital importance in the successful treatment of this type of reaction. If the convulsions are stopped immediately with an intravenous barbiturate and the

patient ventilated artificially until his own respiratory efforts are adequate, the patient nearly always survives unharmed. If time is lost in mixing a solution or in assembling apparatus for administering oxygen, the patient usually dies. So far as is known, the barbiturates are not chemical antidotes for the local anesthetic drugs. Rather, the pharmacological action of the barbiturates in the treatment of such convulsions is simply one of depression of the motor cortex to the point where it will no longer respond to the stimulating action of the local anesthetic drug.

The mild type of "procaine reaction"—dizziness, anxiety, nausea—requires no treatment other than reassurance. It is self-limited to 10 to 15 minutes in duration. Premedication with the usual dose of a barbituric acid derivative will not prevent either of these types of reaction, although it may lessen the severity of the mild type.

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Coccidioidomycosis as a Complication of Pregnancy

J. E. VAUGHAN, M.D., and HALL RAMIREZ, M.D., *Bakersfield*

SUMMARY

Records of 33 cases of coccidioidomycosis occurring during pregnancy were reviewed. In this group the incidence of dissemination of the disease was considerably greater than the reported incidence of dissemination in all cases of coccidioidomycosis.

The incidence of dissemination was higher in the patients who contracted coccidioidomycosis late in pregnancy than it was in those in whom onset of the disease occurred earlier in gestation; but dissemination occurred in all Negro patients in the group, regardless of the time of onset during pregnancy.

The chief complicating effect when onset was in the first trimester of pregnancy was a tendency to abortion. In cases in which onset was in the third trimester, the incidence of premature labor was extremely high.

There was no evidence of congenital infection in any of the babies, but in one case invasion of the placenta by coccidioidal spherules was observed.

COCCIDIOMYCOSIS occurring during the course of pregnancy has received little comment in the current literature until recently.⁹ The work of Gifford⁵ and Dickson⁴ stimulated further study of the disease. Smith¹¹ and his co-workers have contributed much to present knowledge. The epidemiology,¹² the importance of the coccidioidin skin test,¹⁴ the extent of the endemic area and the introduction of serological tests in the diagnosis and prognosis of the disease¹³ are some of the important contributions. The knowledge that merely driving through an endemic area may result in infection adds to the significance of the disease in differential diagnosis in the western states. The purpose of this presentation is to show the effect of the disease on the course of pregnancy and on the offspring.

Since reporting of non-disseminating coccidioidomycosis is not required, knowledge of its association with pregnancy is incomplete. Case histories of 33 cases of coccidioidomycosis occurring in pregnancy in the period 1942-1949 were obtained from physicians and hospital records in Kern County. Of these, 28 occurred in the 1946-1949 period. The diagnosis in each instance was confirmed by clin-

ical, laboratory, biopsy, and in some instances, autopsy evidence. This presentation will consider mainly the 28 cases that occurred in the four years 1946-1949. During that period there were 25,328 births, live and stillbirths, recorded in Kern County. Thus, the incidence of known cases of coccidioidomycosis was approximately one in 900 pregnancies. Hertig⁷ in a study of abortion concluded that spontaneous abortion occurred in approximately ten per cent of all pregnancies. On this basis the corrected incidence of infection would be approximately one in 1,000 pregnancies. It is significant, however, that three of the four maternal deaths reported in Kern County for the year 1948 were due to disseminated coccidioidomycosis. Reaction to coccidioidin skin tests done routinely at the time of first prenatal visit was positive in approximately 40 per cent of 800 private cases. Dissemination did not occur in any of the cases in which there was previous coccidioidal infection. Cohen and Burnip² reported positive reaction in 47 per cent of mothers at time of delivery in county hospital cases.

Early in this study the authors were impressed with the apparent severity and rapidity of generalized dissemination of the disease when it occurred in the latter part of pregnancy. For this reason the cases are divided into four groups: first, those in which the patients were known to have coccidioidomycosis preceding onset of pregnancy; second, those in which coccidioidomycosis was contracted during the first trimester of pregnancy; third, those in which coccidioidomycosis was contracted during the second trimester; fourth, those in which the disease was contracted during the third trimester.

In Group I (known coccidioidomycosis preceding pregnancy) there were five patients, all of whom recovered (Table 1). Tests carried out on all of these patients showed the presence of complement fixing antibodies without the presence of precipitins before onset of pregnancy. There were complications in four of the five cases: In one case spontaneous abortion occurred at two and one-half months, in two others there was threat of abortion, and one patient had a pulmonary hemorrhage in the first trimester with an interruption of pregnancy. Two patients were delivered of viable infants at term; neither of the babies showed evidence of coccidioidomycosis, but in one there was evidence of humoral or passive transfer of antibodies through the placenta. Reaction to a subsequent coccidioidin skin test was negative.

In Group II (coccidioidomycosis occurring during first trimester) there were 12 patients—ten Caucasians, one Negro, one Mexican (see Table 2). The Negro patient died, the others recovered. There

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was no evidence of coccidioidomycosis in any of the babies.

CASE REPORT

A Negro woman 20 years of age (Case 12, Table 2) was admitted to hospital when approximately three months pregnant, with bleeding and cramping. Spontaneous abortion followed. Skin lesions of short duration were noted. Coccidioidal spherules were observed in biopsy of aspirated material. Reaction to a complement fixation test was +++ at 1:128 dilution. Precipitin reaction was +++++ at 1:40 dilution. A diagnosis of disseminated coccidioidomycosis of

fairly recent origin was made. Actidione, a fungistatic antibiotic, was given. The skin lesions healed rapidly, but approximately three months later the patient died.

Buss, Gibson and Gifford¹ noted that although the non-white group constitutes only about 8 per cent of the population in Kern County, 50 per cent of coccidioidal dissemination occurs in that group.

Gifford⁶ called attention to the fact that in recent years more of the non-granulomatous, non-fatal type of coccidioidal disease had been reported, with more cases in women than in men.

TABLE 1.—*Patients With Known Coccidioidomycosis Preceding Onset of Pregnancy*

Case	Age	Date of Onset	Race	Last Menstrual Period	Serology			Complications During Pregnancy	Mother	Outcome	Infant
					Comp.	Fixation	Dilution				
					1:2	1:4	1:8				
1	32	May 1945	White	Nov. 1945	++++	+	0	0	Threatened ab. 3rd month	Recovery	Term viable. No evidence of coccid.
2	24	1942	White	Oct. 1949	+++++	0		0	Cavity in left apex. No other complications.	Undelivered	Undelivered
3	34	Oct. 1947	White	March 1949	+++++	++	+	0	Spont. abortion $2\frac{1}{2}$ months.	Recovery	-----
4	26	April 1948	White	May 1948	++++	+	+	0	Extreme malaise. Uterine contrac- tions.	Recovery	Term viable. Skin test neg. Passive trans- fer of anti- bodies
5	21	Feb. 1947	White	May 1947	++++	0	0	0	Pulmonary hemorrhage 1st Trimester	Recovery	Therapeutic abortion

TABLE 2.—*Cases in Which Coccidioidomycosis Was Contracted During First Trimester of Pregnancy*

Case	Age	Race	Complications During Pregnancy		Mother	Outcome		Infant
1	18	W	None		Recovery	Term viable. No evidence of coccidioido- mycosis.		
2	23	W	None		Recovery	Term viable. No evidence of coccidioido- mycosis.		
3	23	W	Threatened abortion, 2nd month		Placenta previa bleeding at term. Section. Recovery.	Term viable. Skin test for coccidioido- mycosis negative.		
4	25	W	None		Recovery	Term viable. Skin test for coccidioido- mycosis negative.		
5	26	W	Premature separation of placenta		Section. Recovery	Stillbirth. No evidence of coccidioido- mycosis.		
6	17	W	None		Recovery	Term viable. No evidence of coccidioido- mycosis.		
7	29	W	Erythema nodosum. Extreme malaise. Agglut. and Precip. disappeared.		Undelivered, con- dition good.	-----		
8	21	W	None		Recovery	Term viable. No evidence of coccidioido- mycosis.		
9	20	W	Threatened abortion		Recovery	Term viable. No evidence of coccidioido- mycosis.		
10	23	W	None		Recovery	Term viable. No evidence of coccidioido- mycosis.		
11	22	Mexican	None		Recovery	Term viable. No evidence of coccidioido- mycosis.		
12	20	Negro	Spontaneous abortion. Dissemination. Treated with actidione.		Fatal	-----		

In Group III (coccidioidomycosis occurring during second trimester) there were five patients, three of whom completely recovered without dissemination. Dissemination occurred in two patients, one of whom died. The other was still alive two years after dissemination occurred (see Table 3).

CASE REPORTS

Coccidioidomycosis developed in a 34-year-old white woman during the fifth month of pregnancy (Case 3, Table 3). Dissemination to the meninges occurred shortly thereafter. The patient was given diethylstilbestrol for control of uterine contractions, and, in addition, actidione. A viable infant was delivered spontaneously at term. Results of simultaneous serologic studies on mother and infant were interpreted as being suggestive of humoral transfer of antibodies through the placenta. There was no pathologic evidence of coccidioidal granuloma of the placenta. At the time of this report the patient was still living, but studies of the spinal fluid gave evidence of continuing infection. Later, a complement fixation test of blood from the infant showed a doubtful reaction with 1:2 dilution of serum.

Generalized coccidioidal dissemination developed in a Negro woman 22 years of age in the fifth month of pregnancy. The condition of the patient deteriorated rapidly in spite of all treatment, including actidione. A viable infant was delivered prematurely. Serologic studies gave evidence of passive transfer of maternal complement fixing antibodies to the infant. In pathologic examination of the placenta numerous large and small lesions were observed, both in the decidua and in the chorionic villi. The lesions were necrotic, some appearing caseous, others frankly purulent. These lesions were filled with spherules of *Coccidioides immitis*. Spherules were of all sizes and stages of development. Some large spherules contained encapsulated endospores. Reaction to coccidioidin skin tests of the infant were negative. In a second serologic study, pronounced decrease in the titer of complement-fixing antibodies was noted. The infant died six weeks after birth. All tissues were examined pathologically and no evidence of coccidioidal granuloma was observed.

Cohen³ reported a case of coccidioidal infection in an infant in the second week of life whose mother had San Joaquin fever during pregnancy. The placenta was not examined. Smale and Birsner⁹ reported one case of coccidioidal granuloma of the placenta. However, no information was obtained regarding the mother or the infant.

In Group IV (coccidioidomycosis occurring during the third trimester) there were 11 patients—six Caucasians, four Negroes and one Chinese. Four of the Caucasians had no complications and were delivered of full-term viable infants without evidence of coccidioidomycosis. Generalized dissemination occurred in the other two, who were delivered of premature viable infants; there was no evidence of coccidioidomycosis in the infants. A similar course developed in the case of the one Chinese patient, who delivered a premature viable infant. In four cases in Negroes there was rapid dissemination. One patient was given actidione without any change in the course of the disease. It seems of significance that in Group IV there was a greater number of cases of generalized dissemination, and that dissemination occurred in two white women. Those with dissemination invariably delivered prematurely. Other than passive transfer of complement-fixing antibodies, there was no evidence of coccidioidal granuloma in offspring or in the placentae examined (see Table 4).

DISCUSSION

Smith¹⁰ stated that dissemination occurs in not more than one case in five hundred or a thousand cases of coccidioidomycosis. Even taking into account the probability that two-thirds of primary infections are not diagnosed, the incidence of dissemination in this series still must be considered high. It was particularly high among patients who contracted the disease in the third trimester: Seven of the 11 patients died a short time after onset. Fatal dissemination occurred in all four of the Negro patients in this group.

Page and Bayers⁸ reported a case of coccidioidomycosis which primarily involved the uterus, the fallopian tubes and one ovary. One other similar case had previously been reported. In no case in the present series in which autopsy was carried out was there pathological evidence of dissemination to the uterus, tubes or ovaries. However, multiple implants on the parietal and visceral peritoneum were frequently observed. In one case multiple areas of invasion by the spherules were noted in the placenta, but there was not, in this case or in any other in the

TABLE 3.—Cases in Which Coccidioidomycosis Was Contracted During Second Trimester of Pregnancy

Case	Age	Race	Complications During Pregnancy	Mother	Outcome	
						Infant
1	24	W	None	Recovery	Term viable. No evidence of coccidioidomycosis.	
2	25	W	In car accident. Threatened abortion, premature labor.	Recovery	Premature non-viable. No evidence of coccidioidomycosis.	
3	34	M	Acute onset. Developed meningitis fifth month. Uterine contractions treated with stilbestrol and actidione.	Alive. Still has cells in spinal fluid.	Term viable. Passive transfer of antibodies. No evidence of coccidioidomycosis.	
4	26	W	None	Recovery	Term viable. No evidence of coccidioidomycosis.	
5	22	Negro	Cutaneous lesions fifth month. Meningitis. Treated with actidione.	Fatal	Premature viable. Passive transfer of antibodies; spherules in placenta. Later autopsy of infant, no evidence of coccid.	

series, any evidence of congenital infection of the infant. As far as could be determined, no congenital anomalies occurred as a result of the coccidioidal infection.

TREATMENT AND MANAGEMENT

Dyspnea, during the acute illness, which is commonly out of proportion to the demonstrable pathologic changes in the chest, is greatly relieved by rest. Rest appears to be the one important treatment. This should be carried out just as in cases of tuberculosis until the patient has recovered clinically. Blood sedimentation rate determinations and serological tests indicate the progression or regression of the lesions and may be used as a guide in controlling activity. The authors have found that much of a patient's fears concerning the disease can be relieved by telling him the following facts: First,

the diagnosis of acute coccidioidomycosis cannot be established on the basis of positive reaction to a skin test alone; second, relapses do not occur after recovery from the disease; third, no cases of reinfection have been reported; and, fourth, it is not necessary to move from an endemic area to recover.

In an endemic area it is recommended that a coccidioidin skin test be done on pregnant women at the time of the first prenatal visit. If the reaction is positive, x-ray studies of the chest and serological tests should be carried out to determine the extent of the disease. Patients in whom symptoms of upper respiratory tract disease develop during pregnancy should be carefully studied for coccidioidal infection even though the reaction to the initial skin test was negative. A regimen of strict rest may forestall dissemination.

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TABLE 4.—*Cases in Which Coccidioidomycosis Was Contracted During Third Trimester of Pregnancy*

Case	Age	Race	Complications During Pregnancy		Mother	Outcome	
						Infant	
1	29	W	Generalized dissemination, premature labor.		Fatal	Premature viable, coccid. skin test negative.	
2	23	W	None		Recovery	Term viable. No evidence of coccid.	
3	31	W	Generalized dissemination, premature labor.		Fatal	Premature (8½ mo.) viable. No evidence of coccid. Coccid. skin test negative.	
4	24	W	None		Recovery	Term viable. No evidence of coccid.	
5	25	W	None		Recovery	Term viable. No evidence of coccid.	
6	21	W	None		Recovery	Term viable. No evidence of coccid.	
7	24	Chinese	Generalized dissemination. Meningitis. Premature labor.		Fatal	Premature viable. No evidence of coccid. Skin test negative.	
8	37	Negro	Generalized dissemination.		Fatal	Stillbirth. No evidence of coccid. recorded.	
9	28	N	Generalized dissemination, premature labor.		Fatal	Premature viable. Passive transfer of antibodies. No evidence of coccid.	
10	27	N	Generalized dissemination.		Fatal. Died undelivered.	Infant—no evidence of coccid.	
11	19	N	Generalized dissemination, premature labor. Treated with actidione.		Fatal	Premature (8 mo.) viable. No evidence of coccid.	

TABLE 5.—*Summary of Fatal Cases*

Case	Age	Race	Trimester of Onset	Outcome	Infant
1	29	White	3rd	Generalized dissemination	Premature viable, coccid. negative.
2	31	White	3rd	Generalized dissemination	Premature viable (8½ mo.) coccid. negative.
3	24	Chinese	3rd	Generalized dissemination	Premature viable. Coccid. negative.
4	37	Negro	3rd	Generalized dissemination	Stillbirth, no report on coccid.
5	28	Negro	3rd	Generalized dissemination	Premature viable, passive transfer of antibodies, no evidence of coccid.
6	27	Negro	3rd	Generalized dissemination	At term. Died undelivered. No evidence of coccid.
7	19	Negro	3rd	Generalized dissemination. Premature labor.	Premature viable (8 mo.). No evidence of coccid.
8	22	Negro	2nd	Generalized dissemination	Premature (7 mo.) viable, passive transfer antibodies. Coccid. negative.
9	20	Negro	1st	Spontaneous abortion 1st trimester. Generalized dissemination.	Spontaneous abortion (2½ mo.)

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Mephenesin as a Relaxing Agent in the Treatment of Tetanus

Clinical Experience in 12 Cases

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SUMMARY

Maintenance of a patent airway in cases of tetanus is best accomplished by means of tracheotomy performed early in the course of the disease. This eliminates the possibility of upper respiratory obstruction and facilitates the elimination of irritating and obstructing secretions from the lower respiratory passages. In many cases the amount of sedation required is decidedly reduced following tracheotomy.

The combination of phenobarbital and Tolserol® is very satisfactory in controlling the muscular rigidity and spasm in cases of moderately severe tetanus. In severe cases, response is not always satisfactory.

Severe respiratory depression was observed in only one case in which phenobarbital and Tolserol® were used.

SINCE the introduction of tetanus toxoid immunization, tetanus has definitely become a preventable disease. Unfortunately, however, many cases of this disease still occur, and anesthesiologists frequently are consulted in reference to maintenance of the airway, sedation, and muscle relaxation.

MAINTENANCE OF AIRWAYS

In tetanus, both laryngospasm and complete tetanic spasm of the muscles of respiration are present during the acute episode. Therefore, the method for maintenance of the airway must extend beyond the larynx. This may be accomplished either by endotracheal intubation or by tracheotomy. Since the course of the disease extends over a period of from approximately 10 to 21 days, tracheotomy is the method of choice. As the course of the disease may change very abruptly, this procedure should be performed in all cases of tetanus as soon as a definite diagnosis is made. Constant care must be given the tracheotomy, especially in reference to the accumulation of secretions. In all cases in the series here reviewed, tracheotomy was performed early in the course of the disease.

SEDATION AND MUSCLE RELAXATION

In the past, various agents such as magnesium sulfate, the barbiturates, chloral hydrate and tribromethanol have been used in the treatment of tetanus. In more recent years muscle-relaxing agents such as various preparations of curare and curare-like drugs have been tried. In 1947 Adriani and Ochsner¹ reported five cases of tetanus in which d-tubocurarine chloride was used. In general the results were unsatisfactory. It was observed that relief from spasm was not obtained until the dose which caused almost complete curarization was given; the response was fleeting, and respiratory depression and obstruction were avoided with difficulty. And although favorable reports have appeared in the literature on the use of curare in oil in tetanus, Godman and Adriani² found that results with use of this preparation were not always predictable and that treatment by this method had many of the disadvantages of curare therapy by the multiple-dose method as well as the disadvantage of causing massive overdosage.

Recently the author used a preparation of mephenesin (3-ortho-toloxyl-1,2-propanediol) called Tolserol.³ This is a curare-like compound and has previously been used as a relaxing agent in anesthesia and in neuromuscular diseases characterized by muscle spasm or increased muscle tone. It has been reported to give good abdominal relaxation without intercostal paralysis. Davidson² suggested that its site of action is in the internuncial neurones and stated that, unlike curare, mephenesin does not appear to interfere with voluntary movement but only with spinal cord reflexes, and therefore, presumably, with muscle tone.

The author used this preparation in the form for oral administration, each tablet containing 250 mg. of the drug. In most cases a stomach tube was in place for feeding purposes and provided an easy, non-irritating route for administration of the drug. Twelve patients with tetanus, ranging in age from 22 months to 68 years, were treated. Each received for sedation phenobarbital in doses ranging from 30 mg. to 130 mg. given once, twice or three times daily. Mephenesin was given in doses ranging from 62.5 mg. to 750 mg. in children and up to 3.5 mg. in adults. This was given as often as every two hours in some cases, but the average interval was

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about four hours. The patients had symptoms varying from mild to very severe; in most cases they were moderately severe. Two patients were adults and they did not respond as well as did the children. One child and an elderly adult died. In both of these cases the disease was very severe and was complicated by respiratory infection. One other patient, a child, did not have satisfactory response to treatment with phenobarbital and mephenesin; tribromethanol was given and, after a very stormy course, the patient recovered. In the cases in which response was unsatisfactory, the doses given either were ineffective or produced severe respiratory depression. In the other nine cases the control of muscular rigidity and spasm was satisfactory. No attempt was made to keep these patients completely relaxed at all times. Profound sedation is undesir-

able because of respiratory depression and the difficulty in keeping the airway free from secretions. Phenobarbital or mephenesin, or both, were given as needed to control restlessness and spasm.

Hematuria and abdominal distention have been reported with the intravenous and intramuscular administration of this drug. In this series, in which the drug was given orally, neither hematuria nor abdominal distention was observed.

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Dental Caries

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SUMMARY

The most generally accepted theory as to the cause of dental caries is that certain bacteria in the mouth, in the presence of fermentable sugars, cause the formation of acids which in turn decalcify teeth. Physicians may help reduce the incidence of caries by recommending elimination of refined sugars from the diet, or at least control of the amount consumed.

Cleaning the teeth with a well designed tooth brush after each meal will to a certain extent mechanically remove the fermentable sugar and debris from the teeth. One step further in oral hygiene that may be beneficial is to use a dentifrice with 5 per cent dibasic ammonium phosphate and 3 per cent urea to reduce the formation of acid.

Anything that will increase salivation will aid in buffering any acids that may be present.

A 2 per cent solution of sodium fluoride applied to the thoroughly dried "intact" enamel surface may prevent caries.

Sodium fluoride added to drinking water to a concentration of 1 part per million is utilized by the body in formation of an enamel that is particularly resistant to caries.

DENTAL caries is a universal disease. It may occur in persons of any age, but according to Poncher and co-workers¹⁶ the activity is highest in children between the ages of five and eight and twelve and eighteen years. Caries control is mainly a problem for dentists and, since dental caries should be repaired as soon as possible, children susceptible to caries who are in the age groups having the highest incidence should have their teeth examined at least twice a year and perhaps more often.

Caries prevention, which is even more important than caries control, is both a medical and a dental problem. Physicians can be of great assistance in this field.

Massler¹⁴ supported the theory that heredity plays a part in dental caries. A genetic factor directly related to caries resistance has been established in laboratory animals. Some people regardless of poor diet and poor dental care may have no caries; some, in spite of excellent diet and excellent dental care, will have caries. However the majority of people are between these two extremes and for them diet and dental care are important.

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DIET

Diet is important to teeth from the formative stage through the life of the teeth; and, as was pointed out by Schour¹⁷ and Davison,⁴ all food elements—proteins, fats, carbohydrates, minerals, vitamins, etc.—that are essential for good nutrition are an aid toward having good teeth. The most vital materials needed by teeth, according to Bessey² and Gordon,⁷ are: (1) minerals—calcium, phosphorus, iron, fluoride and traces of others, and (2) vitamins—A, D, C, and B complex (pantothenic acid, niacin, riboflavin and thiamine). These are especially important during the formative stage of the teeth.

It has often been observed that malnourished and rachitic children have much less dental decay than do well-nourished children. Following the recent war this fact was reemphasized by Massler¹⁴ when children of war-torn areas and young adult prisoners of war were observed to be remarkably free of caries. This was thought to be due to a sharp reduction of sugar intake and to a deficiency in the vitamin B complex. The B complex vitamins are essential to the enzyme systems of acidogenic bacteria, and their absence inhibits the enzyme systems in these bacteria, causing reproductions to cease. However, the vitamins of the B complex are essential to the body for other reasons and therefore they cannot be eliminated from the diet. Carbohydrates are also essential in the diet, but refined sugars are not and can be left out entirely with no ill effect, physiologically.

REFINED SUGARS

All carbohydrates can be left out of the diet entirely for several weeks with no ill effect. Jay⁸ claimed that in many cases the flora of the mouth can be changed and the lactobacilli inhibited for as long as two years by eliminating all carbohydrates from the diet for two weeks, then adding starches as the only carbohydrate for the following two weeks. Becks¹ said that refined sugars are not essential to the diet. Moreover, eating them in quantity may cause exclusion of essential dietary substances. But according to Noyes¹⁵ in some cases in which there is an acquired taste for them, deprivation can cause psychological trauma. With practicality in mind, it is probably a good policy to advise, "No refined sugars except as dessert following the evening meal, and then be particularly careful to brush the teeth immediately afterward."

The mechanism of acid formation from fermentable sugars by means of bacterial enzymes has been extensively studied. Fosdick⁶ stated that acid is the only substance likely to be in the mouth that is capable of dissolving the inorganic portion of the tooth. Thus anything that will interfere with acid production will decrease the incidence of caries. A variety of organisms are capable of producing acids

that will decalcify teeth and some of these bacteria are always present in the mouth. *Lactobacillus acidophilus* is only one of these organisms, but there is a direct relationship between the number of lactobacilli and caries activity. Bibby³ pointed out that the *lactobacillus acidophilus* index is a useful measure of caries activity. These acid-producing organisms do not produce significant amounts of acid unless fermentable sugars are present. Thus, eliminating refined sugars would not only be beneficial in this respect, but, according to Massler,¹³ sugar control is the only effective dietary measure for the control and prevention of caries in children. Since carbohydrate must be present in the diet (Drenckhahn and Taylor⁵), it is desirable to brush the teeth each time after eating, to remove as much of the debris that collects in cracks and crevices as possible.

AMMONIA-UREA COMPOUNDS

Within the last three years another interesting development has occurred in the field of caries prevention. Massler¹⁴ pointed out that in a normal mouth there is apparently somewhat of a balance between the acidogenic bacteria and the group of organisms that produce ammonia. In a caries-susceptible person the acidogenic bacteria overbalance the ammonia-producing organisms. Conversely, in the mouth of a caries-resistant person there is a preponderance of ammonia-producing organisms and a low *lactobacillus acidophilus* count. It has been claimed that a dentifrice or mouth wash with 5 per cent dibasic ammonium phosphate and 3 per cent urea does two things: It neutralizes acids present and, more important, it changes the oral flora to an ammonia-producing type and at the same time inhibits the growth of *lactobacillus acidophilus*.

FLUORIDES

The presence of fluorides, like the lack of vitamin B complex, inhibits the enzyme systems of acidogenic bacteria. According to one theory this inhibition accounts for the reduction of dental caries when sodium fluoride is used. The easiest, most efficient, and most economical way to use fluoride is to see that the communal water supply contains one part sodium fluoride to one million parts water. (It should be noted, however, that Kulstad¹² has cautioned that this is still experimental.) When fluoride is present in a fetus, or in a baby or child forming teeth, it becomes incorporated in the enamel of the teeth and renders them less susceptible to caries. After the permanent teeth have formed, which usually means after eight years of age, ingestion of fluoride has no effect. Water containing less than 0.5 parts of fluoride per million parts does not seem to have any demonstrable effect, according to Massler.¹⁴ Fluoride content of one part per million reduces the incidence of caries by 40 to 60 per cent, but a very mild mottling of the enamel in about 10 per cent of the children develops. Dental caries is further reduced if the fluoride content of the water is increased up to 1.5 parts per million,

but the incidence and severity of mottling also increase. Fluoride concentration of above 1.5 parts per million results in no further decrease in caries. When the concentration of fluorides rises to 2 parts per million, mottling and even pitting of the enamel occurs in approximately 50 per cent of the children born and reared in areas where such a large amount of fluoride is continually ingested.

Local application of sodium fluoride is capable of reducing the incidence of dental caries by 25 to 40 per cent in recently erupted teeth with intact enamel. According to Massler¹⁴ the accepted method of topical application of sodium fluoride consists of an initial, thorough dental prophylaxis which is followed by a minimum of four treatments within a period of two to three weeks. A 2 per cent solution of sodium fluoride is applied to the thoroughly dried enamel surface and allowed to remain for 4 or 5 minutes until the solution dries. However, it is effective only when applied with careful technique on *intact* enamel; and the effectiveness has only been demonstrated in children. To be most effective, topical application of fluoride should be instituted when the child is between 6 and 12 years of age—the earlier the better. It is likely to be much less effective after the second permanent molars are through the gum (after 15 years). Kesel,¹⁰ as well as others, expressed belief that this method will be useful in preventing dental caries.

When sodium fluoride is applied topically, the enamel absorbs ionized fluoride and becomes more resistant to acid decalcification. Knutson¹¹ said that, experimentally, fluoride-treated enamel was demonstrated to be harder than untreated enamel; and it was also observed that the hardness increased as the exposure to fluoride solution was increased, up to 20 minutes. The change in hardness extended to a depth of approximately thirty microns.

Fluorides in the form of tablets, lozenges, dentifrices, and mouth washes have very little effect because they are in the form of insoluble calcium fluoride to comply with the Pure Food and Drug Act which excludes toxic preparations. They do not provide ionic fluoride in the mouth to inhibit bacterial action, and as insoluble fluoride is not absorbed by the intestinal tract, there is no systemic effect. Fluorides added to milk have no effect because insoluble calcium fluoride is formed.

Poor oral hygiene and improper diet are doubtless contributory to the high rate of caries in children in the five- to eight-year age group. But why the increased rate in the 12 to 18-year age group? Johnston⁹ in his metabolic studies at Henry Ford Hospital in Detroit probably has given one answer to this question. Because of the spurt of growth before, during, and after puberty, youngsters in this age group have an unusually high demand for the materials used in growing. Consequently, many adolescents are found to be deficient in certain things essential to nutrition, especially nitrogen, calcium, vitamin A, vitamin D and, undoubtedly, others. Some of these nutritional needs, plus, per-

haps, greater consumption of refined sugars at this age, may help account for the increased incidence of caries.

The buffering action of saliva has an effect on caries. It has been shown experimentally in animals that if the salivary glands are tied off, the teeth deteriorate rapidly. The practical application of this is that anything that stimulates the flow of saliva would tend to lessen caries; conversely, anything that reduces the amount of saliva would promote caries formation.

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Children's Dental Health Week

In connection with Children's Dental Health Week, February 5 to 12, the California State Dental Association issued the following information and recommendations:

VITAL NEED FOR INTENSIVE DENTAL HEALTH EDUCATION

1. Among two-year-olds, 50 per cent have one or more decayed teeth.
2. On the average, children beginning school have six teeth already in the process of decay.
3. Dental studies show that 75 per cent, or more than 21 million of the nation's school-age children need dental care.
4. The 15-year-old has an average of seven missing, filled or decayed teeth.
5. Decay is occurring at a much greater rate than American dentists can repair it.
6. Prevention—through *dental health education* and *proper home care* is still the only answer.

MESSAGE TO PARENTS

1. See that your children observe the dental health rules.
2. Have your dentist apply the fluoride treatment, as it is effective (on children under 15 years) in reducing future dental decay. Applications should be made at around three years. Further treatment should be made around seven, ten and thirteen years. Application is painless.
3. Have your children make use of ammoniated dentifrice. Tests tend to indicate, under certain circumstances, that 5 per cent ammonium phosphate and 3 per cent urea may reduce dental decay.
4. Check your children's teeth-brushing. Paint their teeth with a small amount of 2 per cent mercurochrome. After rinsing the mouth with water, the mercurochrome will stain the film on the teeth. Have them brush the teeth until all stain is removed. Try it yourself—you, too, will miss film!
5. Set the example yourself by proper brushing and care of your teeth. You, too, will profit along with your young ones.
6. Lastly, support your local dental society when it advocates the fluoridation of your local water supply. Tests have proven that when the chemical fluorine is added to our natural water supply, tooth decay in children using the water from birth to eight years is reduced by some 60 per cent.

CASE REPORTS

◀ The Surgical Management of Ruptured Omphalocele

◀ Renal Actinomycosis

The Surgical Management of Ruptured Omphalocele

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OMPHALOCELE is congenital herniation of abdominal viscera through a deficiency in the rectus fascia. As it occurs at the base of the umbilical cord, the extrusion is covered by an exceedingly thin, translucent membrane composed of amniotic and the underlying peritoneum.⁵

The contents of the sac, clearly visible through its wall, vary in proportion to the size of the fascial defect. Small intestine is almost always present, and not infrequently portions of the liver, stomach and colon. In extreme cases the hernia contains all the contents of the abdominal cavity. The integrity of the membrane is limited by lack of vascularity, and rupture is inevitable, although it may not occur for several days after birth.

The feasibility of surgical repair of omphalocele is now widely accepted, and there is conclusive evidence that the number of patients promptly referred for operation has risen sharply in recent years.^{1, 4, 9, 10} As a result of increasing experience, cases formerly considered inoperable are being successfully treated, and at the same time the mortality rate has steadily declined.

Unfortunately, this encouraging trend does not apply to cases in which rupture of the sac has occurred. In a review of the literature, reports of only 15 cases in which operation was successful were found; six of the 15 cases were reported before 1900.^{1, 6, 8, 10, 11, 12, 13} The average length of time between birth and operation was less than four hours.

Generalized fatal peritonitis develops rapidly in all untreated cases and is also the major cause of postoperative death in both ruptured and unruptured omphalocele. O'Leary and Clymer⁴ in a review of 91 cases noted that the mortality rate rose from 21.4 per cent in cases in which operation was done within the first 12 hours, to 44.4 per cent for the group in which operation was carried out in the period between 12 and 24 hours, and to 61.6 per cent in cases in which operation was done more than 24 hours after delivery. Although the newborn is usually considered to be free of infection at the termination of a normal delivery, the degree of sterility is relative, not absolute—an important distinction that is seldom appreciated. It is, therefore, quite evident that the intact sac acts as a temporary barrier against infection. Moreover, it maintains the natural resistance of the peritoneum by protecting it from exposure and trauma. These two transient virtues of the membrane make possible the

relative success of present treatment in unruptured omphalocele.

However, when rupture is present at birth, or if it occurs in the delivery room, this advantage is missing. Exposure and peritoneal infection are concomitant and immediate. It is obvious that treatment of these conditions is as mandatory as repair of the congenital defect.

The purpose of this paper is to present an outline of procedure in ruptured omphalocele which fulfills these requirements and to report a case which is believed to be the first recorded of cure in a premature infant and the second in which an associated intra-abdominal anomaly was also corrected.

Since ruptured omphalocele is an emergency of the first magnitude, institution of treatment must be immediate and must be pursued with the least possible delay until completed. The importance of continuity of rigid sterile technique from birth to end of operation cannot be overemphasized. Exposure of peritoneum in the delivery room instead of in the surgery is no excuse for contamination by unsterile material or personnel. Protection of the viscera from subnormal temperature and drying can be provided by use of moist warm saline compresses. The impulse to attempt reduction of the evisceration should be resisted, since taxis is seldom successful and causes severe trauma to the peritoneum.

A complication peculiar to small fascial defects is strangulation of the bowel produced by the expulsive action of lusty crying. If the intestine becomes cyanotic, the fascial orifice must be immediately extended—even though this permit further evagination. Finally, continuous administration of oxygen in a heated incubator is of distinct value while preparations are being made for operation.

These measures will minimize the hazards incident to rupture but they cannot be permitted to encourage procrastination. The only definitive treatment is surgical repair. There is no period of latency or incubation in peritonitis that may be relied on as a margin of safety, and unwarranted delay will defeat the most meticulous preoperative care.

General anesthesia is preferable to local infiltration. The risk involved is more than offset by less traumatic operation and decrease in operating time due to better exposure and relaxation. Before the bowel is replaced, there should be a careful inspection of the abdomen and intestinal tract. Concomitant anomalies are not infrequently encountered, and those incompatible with life, such as atresias and obstructions due to congenital bands, malrotation of the colon or imperforate anus, must obviously be corrected. Operation should not be prolonged, however, by unnecessary procedures such as correction of Meckel's diverticulum or appendectomy.

The repair of small defects is easily accomplished by approximating the peritoneum and posterior fascial sheath in the first layer, followed by anterior sheath, subcutaneous fat and the skin in the second layer. In dealing with larger

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defects it should always be remembered that closure with more than minimal tension may produce respiratory failure due to embarrassment of movement of the diaphragm, or circulatory failure secondary to pressure on the inferior vena cava. It is better to be content with closure of the subcutaneous fat and skin alone than to run the risk of these serious and usually fatal complications. And in the event that even this cannot be accomplished safely, dissection of the subcutaneous fat and skin must be carried as far laterally, superiorly and inferiorly as may be necessary to encompass the viscera without tension.⁶ In such cases the risk of postoperative mechanical obstruction due to adhesions or necrosis of skin flaps without sufficient blood supply must be faced with the realization that they are complications inherent in a desperate situation.

If it has been impossible to close the fascial defect, there will remain a residual ventral hernia, often of immense size. Although grotesque in appearance and a source of concern to the parents, it does not interfere with the normal development of the infant. As time goes on, the abdominal cavity will increase in size and ultimately permit the viscera to occupy their normal confines. This may take many months, but secondary repair should be delayed until it has occurred and the surgeon is satisfied that he can successfully approximate the fascia.

CASE REPORT

A male infant weighing 4 pounds and 3 ounces was delivered two months before term with low forceps after a six-hour labor. The small intestine lay outside the abdominal cavity, having escaped through a defect approximately 1½ centimeters in diameter at the base of the superior aspect of the cord. The remnants of the ruptured sac could be identified at the skin edges.

Respiration was spontaneous and the baby was soon crying vigorously. It was then noted that the exposed segment of intestine was becoming quite cyanotic. An incision was immediately made through the full thickness of the abdominal wall, enlarging the defect by another 3 centimeters, which permitted the remainder of the small bowel, part of the stomach, the transverse colon and the cecum to eventuate. The viscera were covered with warm, moist normal saline compresses and the color of the segment which had been strangulated promptly returned to normal. The baby was then wrapped in warm sterile blankets and placed in a heated oxygen incubator while preparations were made for operation.

Approximately one hour after birth, operation was started under nitrous oxide ether inhalation anesthesia administered through an endotracheal tube with non-rebreathing valve. Constricted beneath a broad band near the base of the mesentery was a loop of small intestine in the shape of a three-leaf clover, with the central loop the longest of the three. Since neither patency nor continuity could be demonstrated beneath this band, it was tediously dissected free, which relieved the obstruction. The bowel was inadvertently opened during this procedure and immediately closed with an atraumatic chromic mattress suture, reinforced with a serosal stitch. Exploration revealed no further abnormalities. The abdomen was closed with two layers of interrupted fine cotton without causing undue tension.

The patient was returned to the oxygen incubator in good condition and given 50 cc. of 5 per cent glucose in Ringer's solution by clysis. Parenteral feeding, including blood transfusions, was continued along with oral feeding for the next two days, during which time the patient regurgitated frequently. Bowel movements occurred daily from the time of operation. By the fourth postoperative day most of the formula by mouth was being retained. A staphylococcal wound infection developed on the seventh day; it promptly

cleared when sutures were removed. The body weight reached a low of 3 pounds 13 ounces on the third day; then followed an uninterrupted gain to 4 pounds and 11 ounces on the 14th day.

At that time severe infectious diarrhea developed, and during the week required to bring it under control the body weight declined to within 1 ounce of the weight at birth. The patient was discharged on the 37th postoperative day, asymptomatic and eating well, with body weight 5 pounds 11 ounces. At eight months of age, the patient was healthy and energetic and without weakness of the abdominal wall. The body weight at that time was 20 pounds.

The incidence of omphalocele, intact or ruptured, occurring alone or with other anomalies, in stillborn or live births, operable or inoperable, is at present impossible to determine accurately for several reasons. Not the least of these is the confused nomenclature. The condition has been recorded as exomphalos, funicular hernia, amniocle, congenital evantra-tion and even as umbilical hernia. Therefore, it seems quite obvious that the vital statistics of public record must conceal many cases under even other diagnoses, especially if death ensued. The confusion of multiple names for this condition should be corrected by the universal adoption of the term omphalocele, as suggested by Ladd and Gross.⁹

It is indeed a rare anomaly and only some 400 cases have been reported to date in the world literature.² In large teaching clinics, where reasonable accuracy may be expected, the rate has been estimated to be from one in 4,000 to one in 11,000 births.^{2, 7, 12, 16}

On the basis of these statistics, there would be approximately 40 cases a year in California alone—and it must be assumed that the vast majority of the patients die.

The number that might be saved will be determined only when obstetricians and surgeons are aware of the possibility of cure through proper preoperative care and prompt surgical intervention.

SUMMARY

Ruptured omphalocele is an urgent surgical emergency requiring continuous sterile technique and careful protection of the exposed bowel from birth until end of operation.

Concomitant anomalies incompatible with life must be recognized and corrected at time of operation.

The abdominal contents must be covered without excessive tension, even though a residual ventral hernia remains to be corrected at a secondary operation.

The successful treatment of a case complicated by prematurity and concomitant bowel obstruction due to congenital band is reported.

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Renal Actinomycosis

With Report of a Primary Case

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PRIMARY or solitary renal actinomycosis is a rare disease. Since Israel first reported a case in 1878¹ 31 others have been recorded. Only 15 of the reported cases appear to have been truly limited to the kidney. An additional case is reported here because of the rarity of the lesion and to emphasize that recent advances in therapy demand specific identification of the actinomycete if cure is to be obtained.

ETIOLOGY

The cause of this disease is a saprophytic, facultative, anaerobic fungus. The colonies appear in the pus from lesions or are imbedded in granulation tissue and appear as irregular, yellow granules from 0.5 to 2 mm. in diameter. These are the so-called "sulfur granules." They may be soft and easily crushed or hard and calcareous. As observed microscopically, these granules have a central mass of debris, pus cells and degenerated fibers. Toward the margin is a dense network of interlacing, branched filaments. At the periphery are isolated, radiating filaments terminating in clubbed ends. The mycelial filaments are Gram-positive.

According to the classification of Weed and Bagetoss² the human pathogen is called *Actinomyces israeli*. *A. bovis* is the anaerobic organism producing lumpy jaw in cattle. *Nocardia* is the name given the aerobic form of actinomycetes once thought to cause all cases in man and now incriminated in only 10 per cent of cases.^{2, 4}

It was formerly thought that actinomycosis was contracted through ingestion or inhalation of contaminated straw, grains, or grasses, and this erroneous conception still is to be found in some present-day textbooks. It has been proved that *A. israeli* lives as a harmless saprophyte in the mouths, tonsils, and intestinal tracts of normal human subjects. Davis⁴ stated that Naeslund cultured pure colonies of the organism from the mouths of healthy persons. These colonies, on injection, produced the disease in guinea pigs. Two cases have been reported in which actinomycosis followed human bites by persons without evidence of the disease

(Cope in England and McWilliams in the United States, according to Davis).⁴

The oral cavity is the most likely portal of entry for the organism since the most common site of the disease is about the head and neck. Swallowed organisms may lodge in the cecum or appendix. Seven cases of renal actinomycosis following appendectomy have been reported. Gardiner⁵ reported that 8 per cent of removed appendices contained colonies of actinomycetes.

Edwards⁶ reported that Henrici was able only rarely to infect experimental animals with single injections of *A. bovis*. Repeated inoculations were required, suggesting that repeated exposure leading to sensitization was an etiologic factor.

Infection with other organisms may play a role in the initiation of the disease process, or in extension of it once it is present. Repeated sore throats or diseased tonsils have been noted in some patients prior to onset. Pneumonia or trauma to the chest have preceded pulmonary lesions in other instances.

PATHOLOGY

The term primary renal actinomycosis is used here in the same sense that renal tuberculosis is termed primary. That is, it must be assumed that an earlier lesion existed somewhere in the body from which the kidney became infected. The patient probably was symptomless at the time of this early lesion and demonstrable residual traces are absent. That it must have existed, however, is indicated by the presence of the disease in the kidney.

The characteristic lesions are chronic abscesses as a result of progressive penetration and destruction of tissue. Tissue reacts to the invading parasite by the formation of nodules of granulation tissue rich in vessels and cells. The centers of these nodules then break down by a process of lipid degeneration and become filled with leukocytes, debris, and sulfur granules. In the wall of granulation tissue about the abscesses are many mononuclear and occasional giant cells. As the lesion ages, pronounced formation of connective tissue replaces most of the granulation tissue. Thus the lesion of actinomycosis is a chronic, suppurating granuloma. The lesions vary in size from that of a pinhead to that of a grapefruit.

Extension from the primary site is usually by direct spread to tissue and along fascial planes. The lymphatic system is almost immune and the lymph nodes do not react and enlarge. The skin is involved late in the process, as it offers great resistance. Muscles and nerves may be invaded or pushed aside. Bones may be superficially involved by direct continuity. Rarely, hematogenous spread occurs and then any organ may be involved. Primary renal actinomycosis is initiated in this manner. Secondary renal lesions occur when the kidney is involved contiguously.

Grossly, a variety of pathologic changes may be observed in the infected kidney. When the lesion is minimal, only one small area is affected. On cut surface of the kidney a pyramidal area of granulation and scar tissue may be observed, the apex pointing toward the renal pelvis in the region of a renal papilla indicating the hematogenous origin of the infection. Within this may be seen yellowish streaks or granules, and abscess cavities of varying size which may also contain the yellow sulfur granules. The granuloma may extend through the capsule to invade the perinephric fat. Frequently a perirenal abscess is produced. When involvement is more diffuse, the entire kidney may be converted into a suppurating, granulomatous mass. Subsequently, multiple sinus tracts discharge to the skin. If the involvement begins in the lower pole and spreads to include and obstruct the

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ureter, hydronephrosis will appear. Calculus formation and pyonephrosis are logical sequelae. Such calculi may be composed of a fossilized mass of actinomycetes, as in Israel's case, in which, presumably, a parasitic colony served as the nucleus for the deposition of urinary salts.

Unlike renal tuberculosis, in which predilection for involvement of the ureter and the bladder is so common, in actinomycosis apparently the infected urine may be discharged from an actinomycotic kidney for weeks or even months without producing any pathologic changes in the urinary passages below.¹

DIAGNOSIS

In a review of 33 cases—16 in which renal actinomycosis was solitary (demonstrable only in the kidney) and 17 in which it was confined mainly to the kidney—it was noted that the commonest symptoms and signs reported resembled those of renal tuberculosis, pyogenic infection or tumor. The symptoms and signs in the order of frequency are listed in Table 1.

The disease was correctly diagnosed in eight cases before operation or autopsy. The organisms were found in the urine in five cases, in pus from draining sinuses in two, and in both urine and pus in one case.

Renal tumor was diagnosed in nine cases, renal tuberculosis in five, and renal infection in six. Ureteral calculus was the preliminary diagnosis and finding in three cases. Perinephric abscess was the primary diagnosis in two cases and was an associated development in nine others. Spontaneously draining sinuses were noted in one patient. Sinuses occurred after incision and drainage of a perinephric abscess or exploration in eight cases, and after nephrectomy in seven.

Cystoscopy may demonstrate nothing abnormal or only the changes of inflammation. Gardiner⁶ observed sulfur granules on the vesical mucosa about the ureteral orifices in one case.

Pyelograms may disclose the typical deformity of a renal tumor, the moth-eaten ulceration of tuberculosis, the changes of chronic infection, or the signs associated with perinephric abscess. Ureteral involvement may also simulate the irregular moth-eaten appearance of tuberculosis. Gardiner reported shortening of the ureter with obliteration of its pelvic curve.

TREATMENT

Treatment of actinomycosis when confined to the kidney has been much more satisfactory than treatment of abdominal actinomycosis. Comprising only 20 per cent of all cases, abdominal actinomycosis has accounted for over 50 per cent of the deaths. In Davis' series all patients died within 14 months.⁴

Nephrectomy was done in 22 of the 33 cases reviewed by the author. Six of the patients died within one year and the others recovered. Reports of progress, however, were far from complete. Of the 16 patients with solitary renal actinomycosis, 13 were treated by nephrectomy and two died.

Experience with the sulfonamides and the antibiotics has brought some encouraging results, but these methods of therapy are specific and demand specific and accurate diagnosis.^{1, 2, 3, 11, 12} Actinomyces israeli and *A. bovis* respond to penicillin but not to sulfonamides. The reverse is true of the aerobic form, *Nocardia asteroides*, which causes 10 per cent of the infections in man. Treatment with sulfonamides and penicillin is not to be undertaken lightly in this disease because of the large amounts sometimes required. In one case of abdominal actinomycosis recently reported, 30 to 40 million units of penicillin was given daily for eight days, 11 to 14 million units daily for 26 days, and 800,000 units daily for 29 days. Cure was achieved after an illness of 16 months in which treatment consisted in the usual doses of penicillin.¹⁰ In a case reported by Glover⁷ in 1948 a patient with a pul-

TABLE 1.—Incidence of Signs and Symptoms of Renal Actinomycosis as Reported in 33 Cases in the Literature

	Number of Times Reported
Specific Symptoms:	
Pain in the flank.....	22
Mass in the flank or abdomen.....	14
Chills and fever.....	14
Irritative vesical symptoms.....	11
Draining sinuses.....	10
Hematuria.....	8
Pyuria.....	4
General Symptoms:	
Malaise.....	14
Loss of weight.....	13
Low grade fever.....	10
Anemia.....	9

monary infection with the *Nocardia* organism received 1,268 gm. of sulfadiazine in a five-month period.

Streptomycin does not appear to offer much promise in the therapy of actinomycosis. Resistant strains develop quickly.³ Reports of treatment with aureomycin or chloromycetin have not reached the literature yet.

Weed and Bagetoss¹² recently emphasized some of the problems in making an accurate diagnosis. They stated that it is frequently impossible to make an etiologic diagnosis from histologic study alone as has been done in the majority of the reported cases. A wide variety of other organisms not sensitive to the sulfonamides or to penicillin may produce granules resembling those of actinomycosis. To differentiate them, a Gram stain of the section of tissue must be done and the filaments typical of actinomycosis demonstrated. Even after these filaments are found, the anaerobic (*A. israeli*) and the aerobic (*N. asteroides*) forms remain to be differentiated. However, most of the aerobic forms are acid-fast and identification thus can be made by use of the Ziehl-Nielsen stain. Accurate diagnosis and choice of specific therapy depend upon accurate bacteriologic study.

The fundamental surgical principles of adequate drainage and excision of devitalized tissue should be followed. No amount of chemotherapy will avail if these are ignored.

Iodides, methenamine, x-ray and radium and diverse vaccines⁹ have all been used in the past without much success.

REPORT OF A CASE

A 77-year-old white woman was admitted to the San Diego County General Hospital June 18, 1949, complaining of inability to urinate for two days and irritative symptoms, referable to the bladder, of increasing severity for several weeks. The patient was confused, irrational, and obviously critically ill. The patient had been under the care of two different urologists during the previous two years and had been treated for chronic, recurrently acute urinary infection.

The patient had been well until two and a half years before admission when she began to have increasingly severe irritative and obstructive vesical symptoms. A complete urologic survey two years prior to admission had disclosed a prominent cystocele, a bar type of obstruction at the vesical neck, acute cystitis, acute right pyelonephritis, a calculus 5 mm. in diameter in the low major calyx of the right kidney, and grade I, right-sided, congenital hydronephrosis with slight caliectasis. The left kidney was essentially normal (Figure 1, left). The vesical urine contained many pus cells and Gram-negative bacilli. Additional findings were auricular fibrillation and electrocardiographic evidence of chronic coronary insufficiency. There was slight residual evidence of a recent, mild cerebrovascular accident. Perineorrhaphy was done shortly thereafter.

The symptoms and infection of the urinary tract persisted, leading to another urologic survey several months later. New findings at that time included severe ulcerative cystitis and a patulous right ureteral orifice. Retrograde pyelograms showed "nephroptosis on the right with chronic caliectasis, pyelectasis, and hydro-ureter. The upper one-third of the right ureter was displaced to the midline." No pronounced changes were noted in the left kidney (Figure 1, right). Cultures of the vesical and renal urine produced *E. coli*. Numerous courses of sulfonamides, penicillin, and one of streptomycin were administered, and while all controlled the acute exacerbations of the infection, they did not eliminate the pyuria.

This conservative therapy resulted in some amelioration of the irritative symptoms referable to the bladder, but the patient went into a slowly progressive decline and was referred to the San Diego County Hospital. On admission, an ovoid, smooth, firm, movable, non-tender mass, 10 by 15 cm., was palpable in the region of the right kidney. The blood pressure was 150 mm. of mercury systolic and 90 diastolic. The temperature was 100° F. On catheterization of the bladder 75 cc. of purulent urine was obtained. Thereafter urinary output varied from one to two liters daily. The urine contained many pus cells and Gram-negative bacilli. Erythrocytes numbered 3,220,000 per cu. mm. of blood, and hemoglobin value was 58 per cent. Leukocytes numbered 17,950 with 89 per cent polymorphonuclear leukocytes and 10 per cent lymphocytes. The urea nitrogen content of the blood was 12.3 mg. per 100 cc.

Generalized acute cystitis, trigonal hypertrophy and inflamed, edematous ureteral orifices were noted in cystoscopic examination. The vesical urine contained 10 to 12 pus cells per high power field, and Gram-negative rods and Gram-positive diplococci. In urine from the kidneys there was



Figure 2.—Retrograde pyelogram at time of admission of patient to hospital, illustrating expanding lesion of the lower pole of the right kidney displacing the pelvis and upper part of the ureter medially and compressing and distorting the lower calyces.

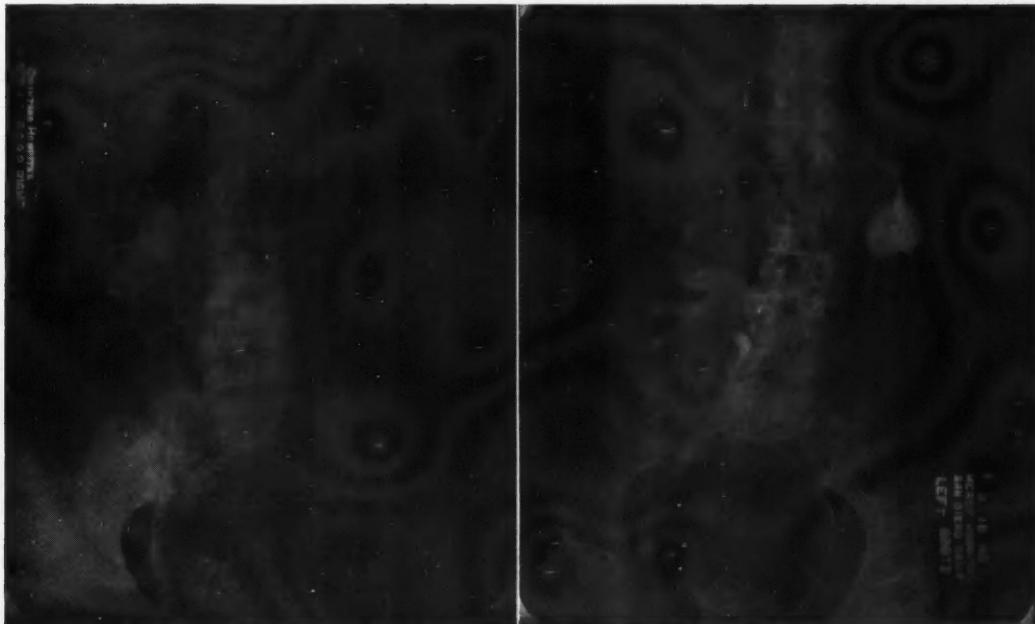


Figure 1.—(Left): Retrograde pyelogram two years before admission of patient to hospital, illustrating grade I right-sided, congenital type hydronephrosis with slight caliectasis. A calculus 5 mm. in diameter was noted in the right lower major calyx on plain films. (Right): Retrograde pyelogram one year before admission, illustrating increase in the right-sided hydronephrosis and displacement medially of the upper part of the ureter on the right side. Grade I nephroptosis also has appeared.

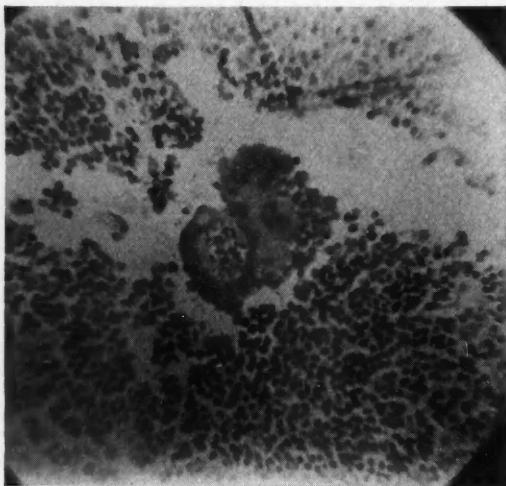


Figure 3.—Photomicrograph of an actinomycotic colony in one of the small abscesses in the granulomatous tumor of the right kidney.

an occasional pus cell but no bacteria. The excretion of phenolphthalein was normal on the left side but decreased on the right, the dye not appearing for eight minutes and only 2.5 per cent being obtained in ten minutes. Retrograde pyelograms showed no change from previous films on the left side. On the right side, an expanding lesion of the lower pole of the kidney displacing the pelvis and upper ureter medially and compressing and distorting the lower calyces, was observed (Figure 2). The diagnosis was tumor of the right kidney. However, operative intervention was not proposed in view of the obvious terminal condition of the patient.

Despite penicillin and sulfadiazine, a "septic" temperature curve persisted, although the pyuria cleared. The hospital course was progressively downhill and the patient died 12 days after admission.

At autopsy a granulomatous tumor was found to occupy the lower pole of the right kidney, most of which had been destroyed. The granulomatous process involved the perinephric fat adjacent to it. No large collection of pus was found. The pelvis and calyces were not invaded. Grossly the lesion resembled actinomycosis and this diagnosis was

substantiated by histologic study (Figure 3). No other actinomycotic foci were found.

SUMMARY

Reported in this presentation is a case of primary renal actinomycosis simulating tumor. It is believed to be the sixteenth case of record in which the disease was confined to the kidney.

Since specific chemotherapy (combined with surgical treatment) recently has given encouraging results in the management of actinomycosis, accurate and specific diagnosis is essential, first to establish the presence of actinomycetes, and then to determine the particular strain of the fungus so that the most effective sulfonamide or antibiotic agent may be selected. This may be accomplished through adequate bacteriologic studies.

3415 Sixth Avenue.

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California MEDICINE

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EDITORIALS

No Bargain

"Any way you look at it, socialized medicine is no bargain and the carpenters want none of it." With those words Mr. William L. Hutcheson, general president of the United Brotherhood of Carpenters and Joiners of America, gave the assembled delegates of the American Medical Association the views of one large and important segment of American labor on the issue of compulsory health insurance. His remarks were made at the December meeting of the American Medical Association in Cleveland and were greeted with loud and prolonged applause by the audience of about five hundred.

To appreciate the magnitude of Mr. Hutcheson's remarks one must recognize his position in American labor circles. First, he is general president of one of the largest and oldest craft unions in the country. With a membership of more than 700,000, the Carpenters and Joiners occupy one of the top brackets in the labor movement. Next, consider that this union is the leader among all construction trades unions in establishing contracts for wages, working conditions and other employment factors; its regular contracts with employers expire earlier in the year than those of the other construction unions and its renewals regularly serve as a pattern for the entire industry.

As to Mr. Hutcheson himself, let it be remembered that he has consistently maintained a top place in union leader circles, both within and without the labor movement. He has often been called into White House conferences on labor matters, even at times when Messrs. Green, Lewis and Murray were

in public disfavor. Known as a sound labor leader with a keen appreciation of labor's responsibilities to the public, Mr. Hutcheson has earned for himself an enviable reputation as an able administrator, a sound analyst of public and economic conditions and a student of legislative and political trends. On top of that, he is noted as a rugged individualist who speaks his mind to any listener, regardless of rank or position. Small wonder that he has been elected to one of the top vice-presidencies of the American Federation of Labor.

Mr. Hutcheson started out his address to the A.M.A. with the flat statement: "I am against socialized medicine." He immediately followed with the fact that his union is likewise opposed to it and pointed to the fact that at the union's annual meeting a few months ago the delegates had voted down a resolution to support "the national health program."

From that start Mr. Hutcheson discussed such items as cost, distribution of medical service and regimentation under government control. Describing carpenters as an independent lot, he stated that "the first bureaucrat who told a carpenter that he had to work in Little Rock when he wanted to work in Lancaster would be gumming his food for lack of teeth."

With that and similar statements the head of the carpenters' union pointed to the community of interest of labor and medicine in opposing "concentration of authority in Washington" and expressed his pleasure in aligning his segment of the labor movement with medicine in this fight.

Medicine is indeed grateful to Mr. Hutcheson for his able and straightforward support. It is even more grateful for the knowledge that the rank and file of labor is not supinely accepting dictation from above, whether that area lies within the labor unions themselves or in bureaucratic circles in the national capital.

In past months many labor leaders have confided their own distrust of compulsory health insurance because of the threat of regimentation that it involves; at the same time they have given lip service to the pronouncements of their national leaders that enactment of health insurance legislation will constitute an indirect increase in wages and therefore be advantageous to their members. The national leaders have also given forth with pronouncements on political candidates and have prepared lists of those to be "purged" because of their support of the

Taft-Hartley Law or other bills adopted by the Congress.

In the November elections the rank and file of labor expressed itself in clear terms at the ballot box; the return of Senator Taft to office by the greatest majority he ever polled is an outstanding example of how the laboring man feels about his representatives in Washington. Similar examples are to be found in many other places.

Now, with a national labor leader coming out flatly against compulsory health insurance, the fundamental belief of labor in opposition to compulsion begins to emerge openly. The community of interest in this direction, with medicine and business, has now been expressed in the clear voice of a man whose own integrity is beyond dispute. Mr. Hutcheson is to be congratulated on his soundness, his courage and his open expression of conviction.



Questions and Answers about C.P.S.

Question: How much longer will the C.P.S. physician member be discriminated against in favor of the non-member physician?

Answer: There is, in fact, no such discrimination. One physician, by reason of his being a C.P.S. physician member, shows his support of the medical profession's endeavor to provide prepaid medical care, and agrees to conform to C.P.S. rules which are formulated by his own representatives—the C.M.A. House of Delegates who are also the C.P.S. Administrative Members. Neither is there discrimination against the non-member physician because he may treat C.P.S. patients if they choose his services. Both members and non-members are paid the same fees for services rendered. Where a C.P.S. patient's income is below the \$3,600 income ceiling, the physician member accepts C.P.S. fees in full payment of services. This is an example of his support of, and belief in, the prepaid health care formulated by his own profession in California. The non-member is not bound by the income ceiling. But where the patient's income is more than \$3,600, member and non-member physicians are in the same position—they may bill according to their usual charges for the services rendered.

Question: What has happened to the Veterans Home Town Care Program? I have claims lagging five months without payment.

Answer: Without the veteran's name it is not possible to give a specific answer to this question. However, it can be said that the Veterans Program is still in full swing and increasing in volume. If claims have not been paid, it must be assumed that the physician's office is perhaps not following the correct procedure of securing authorization for treatment of a veteran patient. Occasionally, a physician requests authorization directly from the Veterans Administration and not from C.P.S. In instances of this nature, there may be considerable delay in processing claims.

Question: Our patients feel that there is a marked discrepancy between what they are promised and what they actually derive from C.P.S. membership. Please comment on this.

Answer: All C.P.S. members receive a Summary of Benefits which gives detailed explanation of benefits, and also are provided with other informational literature. Despite C.P.S.'s best efforts, there are various reasons why it is not possible to avoid every misunderstanding about benefits. Salesmen can, and do, explain contract coverages to employees, but it is not possible to contact family dependents, who often do not have exactly the same benefits as the employees. Further, it is common knowledge that the average person does not carefully study the pro-

visions of any type of insurance he carries. In addition, administration of medical contracts is much more complicated than other forms of insurance, such as life and automobile.

Question: I understand C.P.S. has been working on the sum of \$16.00 for assistants in surgery. Why was this sum established?

Answer: The assistant's fee, set by the last Fee Schedule Committee, was \$20.00 total for any operation. Because of complaints which followed this action, the Board of Trustees at a recent meeting changed the fee to \$20.00 for the first two hours and \$7.50 for each additional hour or portion thereof. The Board's action, effective since October 1, restores the "time basis" to the evaluation of the assistant's fee and should make adequate allowance for operations of long duration. The reason physician members were not generally informed of this change is that the entire fee schedule is still under study for possible further revision.

Question: In view of the new C.P.S. contracts, what steps are being taken to inform doctors and their secretaries of the changed benefits, etc.?

Answer: The C.P.S. Physician Relations Department has undertaken an increased statewide program of group instruction meetings to explain benefits and procedures under the new C.P.S. Medical, Surgical and Hospital contracts. In addition to the explanation of the new contracts, these group meetings will include the customary instruction on C.P.S. billing procedures and other pertinent matters.

C.P.S. is also preparing, and will soon distribute, a new Physician Relations Manual to every physician member. The manual provides a complete and permanent source of information on C.P.S. procedures as they apply in medical offices. Subjects covered include: Thorough explanation of the new contracts and point-by-point listing of differences between old and new contracts, the income ceiling, catastrophic coverage, the new labor plan, billing and identification cards.

Question: Under new C.P.S. contracts, will patients be issued new identification cards?

Answer: Yes. These new cards, incorporating a coding system for determining patients' benefits, are fully described in the new Physician Relations Manual (see answer to preceding question). The manual explains the code system and presents visual descriptions of the new cards, with examples of various types of benefits by their code designations. This section of the new manual will be particularly valuable to doctors, nurses and secretaries as a permanent "key" for telling just what benefits a C.P.S. patient is entitled to.

NEWS and NOTES

NATIONAL • STATE • COUNTY

LOS ANGELES

The following officers of the Los Angeles Radiological Society have been elected to serve during the year 1951: President, Dr. Moris Horwitz; vice-president, Dr. Joseph Linsman; secretary, Dr. Harold P. Tompkins; treasurer, Dr. M. M. Haskell; member of the executive committee, Wybren Hiemstra.

* * *

The Beverly Hills Medical Society has elected the following officers for 1951: Dr. James C. Doyle, president; Dr. Clyde O. Wood, vice-president; Dr. Esther M. Kirk, secretary-treasurer.

* * *

Ceremonies formally opening the Los Angeles County Physicians Aid Association's home for needy physicians and their wives or widows were held January 7. In announcing the event, Dr. Elizabeth Mason-Hohl, president of the Aid Association, said that purchase of the 30-room home with spacious grounds at 3500 West Adams Boulevard was made possible by "the many doctors who have contributed so generously throughout the years."

SAN FRANCISCO

Some 5,000 physicians are expected to attend the annual scientific assembly of the American Academy of General Practice which is to be held in San Francisco March 19 to 22, according to Dr. Ivan C. Heron, who is directing arrangements for the meeting.

Dr. Stanley R. Truman, president of the Academy, said the program will be designed to present new medical information of most practical help to physicians in general practice. It is to be oriented around two main themes: the role of emotions in disease; and sex and family problems and the discipline of children.

* * *

Dr. Francis T. Hodges has been elected president of the San Francisco Academy of General Practice for 1951, succeeding Dr. Henry Gardner. Dr. Donald Lasteto was elected vice-president, Dr. Theodore Paoli secretary-treasurer, and Dr. Donald Campbell a director.

SONOMA

A regional medical and surgical convention, one of a series sponsored in various areas by the Committee on Post-graduate Activities of the California Medical Association, will be held in Santa Rosa, March 8 and 9, 1951. The program for the meeting has been prepared by the post-graduate study committee of the Sonoma County Medical Society in cooperation with Dr. Stacy R. Mettier of the University of California School of Medicine. Although intended primarily for the north coast counties, it is open to physicians from other areas as well.

The program follows:

THURSDAY, MARCH 8, 1951

8:00-9:00 a.m.—Registration at Sonoma County Hospital.

Morning Session

Chairman, JOHN J. MOHRMAN, M.D.

9:00-11:00—Medical and surgical demonstrations. Presentation of clinical cases: Arteriosclerosis obliterans, thromboangiitis obliterans, etc.

a. Obliterative vascular diseases:

1. "Differential Diagnosis"—Charles D. Marple, M.D.
2. "Surgical Treatment"—Edwin J. Wylie, M.D.

11:00-12:00—"Anxiety States as Encountered in Practice"—Robert H. Crede, M.D.

12:15-1:30—Luncheon and Round Table Discussion.

Afternoon Session

1:40-2:30—"Treatment of Bomb Blast Burns"—Leon Goldman, M.D.

2:40-3:30—"Traumatic Injuries of Trunk and Abdominal Viscera"—Orville F. Grimes, M.D.

3:45-4:45—"Injuries of the Extremities, Spine, and Central Nervous System"—Frederick C. Bost, M.D.

6:30—Dinner. Subject, "Radiation"—Robert S. Stone, M.D.

FRIDAY, MAY 9, 1951

Morning Session

*Chairman, JOHN G. MCGRATH, M.D.
At Santa Rosa Memorial Hospital*

9:00-10:40—Medical and surgical demonstrations:

1. Congenital heart disease with cyanosis; patent ductus arteriosus; mitral stenosis—Ellen Brown, M.D.
2. Demonstration of clinical cases—H. Brodie Stephens, M.D.

11:45-12:10—"Diagnostic Problems in Pulmonary Diseases"—Sidney J. Shipman, M.D.

12:15-1:30—Luncheon and Round Table Discussion.

Afternoon Session

Chairman, E. C. BENNETT, M.D.

1:40-2:40—Section on pediatrics: "Bleeding Diseases"—Henry K. Silver, M.D.

2:45-3:45—Section on obstetrics: "Obstetrical Anesthesia and Analgesia"—Edmund W. Overstreet, M.D.

4:00-5:00—Section on gynecology: "Cancer of Cervix"—Herbert F. Traut, M.D.

GENERAL

The American Congress of Physical Medicine will hold its 29th annual scientific and clinical session September 4, 5, 6, 7 and 8, 1951, inclusive, at the Shirley-Savoy Hotel, Denver. In addition to the scientific sessions, the annual instruction seminars will be held September 4, 5, 6 and 7. Full information may be obtained by writing to the American Congress of Physical Medicine, 30 North Michigan Avenue, Chicago 2, Illinois.

* * *

Insurance carriers and self-insured employers have been notified by the Industrial Accident Commission of the State of California of the publication of a new book on measuring joint function. Titled "Evaluation of Industrial Injury," this volume has recently been published by Oxford University Press and is now available through medical bookstores.

The Industrial Accident Commission has adopted a resolution ordering that "the report of the Subcommittee for Standardization of Joint Measurements in Industrial Cases

POSTGRADUATE EDUCATION NOTICES

For more complete information as to fees and time of sessions address the institutions as listed.

UNIVERSITY OF CALIFORNIA MEDICAL EXTENSION, San Francisco 22

Course for General Practitioners:

March 5 to 9, 1951. Mount Zion Hospital, 1600 Divisadero Street, San Francisco.

Non-operative management of intestinal obstruction, diagnosis and treatment of more common cardiac disorders, diseases of breast, common proctological problems, common fractures, thoracic problems in childhood, present-day treatment of syphilis, newer concepts regarding the indications for cesarean section, non-surgical treatment of malignant diseases, behavior problems in childhood and urological problems in childhood.

Graduate Instruction:

February 5 to April 9, 1951 (Monday evenings).

Clinical Science as applied to General Medicine, Part III, Gastroenterology.

Postgraduate Courses for Practicing Physicians:

American College of Chest Physicians

(In cooperation with the University of California and Stanford University)

Recent Advances in Diseases of the Chest—February 19 to 23, 1951. Room 103, University Extension Building, 540 Powell Street, San Francisco.

Address: Stacey R. Mettier, M.D., Head of Post-graduate Instruction, Medical Extension, University of California, Medical Center, San Francisco 22.

STANFORD UNIVERSITY, SCHOOL OF MEDICINE, San Francisco 15

Clinical Ophthalmology—March 26 to March 30. Registration limited to 30 physicians limiting their practice to the treatment of diseases of the eye or eye, ear, nose and throat.

Address: Office of the Dean, Stanford University School of Medicine, 2398 Sacramento Street, San Francisco 15, California.

THE COLLEGE OF MEDICAL EVANGELISTS

Histology and Histopathology of the Eye—February 28 through June 20, 1951.

Varicose Veins—March 1 to April 5, 1951.

be approved by the Commission and that all examining industrial physicians be required, when copies of the report are available, to use the standardized methods of examination contained therein in all industrial cases."

The book was produced under the authorship of a committee headed by Dr. Packard Thurber of Los Angeles and approved by both the Industrial Accident Commission and the Council of the California Medical Association. The Association is listed as the actual publisher of the volume, which gives for the first time a standardized method of measurements for joint disability or function and outlines the methods and instruments for this purpose. The book has been hailed as a long-needed guide in a field where large sums of compensation payments may be at stake and where accurate nomenclature and positive and well-understood methods of measurement have long been lacking. It should be of great value to all industrial physicians as well as insurance carriers and self-insurers.

* * *

"Radiological Defense" is the subject of the 18th Annual Conference of Teachers of Clinical Radiology, to be held February 10 in the Palmer House, Chicago. As the conference "underlines the responsibility of radiologists in atomic attacks," the American College of Radiology said, in announcing the meeting, "it is suggested that state medical associations and county medical societies avail themselves of the services of local radiologists in the development of local civil defense programs."

The National Gastroenterological Association has announced its annual cash prize award contest for 1951. One hundred dollars and a certificate of merit will be given for the best unpublished contribution on gastroenterology or allied subjects. Certificates will also be awarded those physicians whose contributions are deemed worthy. Contestants residing in the United States must be members of the American Medical Association. Those residing in foreign countries must be members of a similar organization in their own country. Entries should be limited to 5,000 words, be typewritten in English, prepared in manuscript form, submitted in five copies accompanied by an entry letter, and must be received not later than June 1, 1951. Entries should be addressed to the National Gastroenterological Association, 1819 Broadway, New York 23, N. Y.

* * *

Dr. David Nye Barrows, director of gynecology and medical executive officer of the New York Polyclinic Medical School and Hospital, was made dean of the institution January 1, 1951. Dr. Barrows is also clinical professor of gynecology and obstetrics at New York University College of Medicine.

* * *

The American National Red Cross will issue an appeal for \$85,000,000 in contributions during the month of March to support the organization's services to the nation's armed forces and its civilian programs. Of the total, \$9,462,000 is expected to be raised in California.

INFORMATION

Facts About A. M. A. Dues for 1951

1. American Medical Association membership dues for 1951 are \$25.

2. Fellowship dues for 1951 are \$5 and are exclusive of membership dues.

3. American Medical Association membership dues are levied on "active" members of the Association. A member of a constituent association who holds the degree of Doctor of Medicine or Bachelor of Medicine and is entitled to exercise the rights of active membership in his constituent association, including the right to vote and hold office as determined by his constituent association, and has paid his American Medical Association dues, subject to the provisions of the By-Laws, is an "active" member of the Association.

4. American Medical Association membership dues are payable through the component county medical society or the constituent state or territorial medical association, depending on the method adopted locally.

5. Fellowship dues are payable directly to the headquarters of the American Medical Association, 535 North Dearborn Street, Chicago 10, on receipt of the bill for such dues.

6. A dues-paying, active member is eligible for Fellowship and may request such status by direct application to the Secretary of the American Medical Association. Applications for Fellowship are subject to approval by the Judicial Council of the Association.

7. Commissioned medical officers of the United States Army, the United States Navy, the United States Air Force or the United States Public Health Service who have been nominated by the Surgeons General of the respective services, and the permanent medical officers of the Veterans Administration who have been nominated by its Chief Medical Director, may become Service Fellows on approval of the Judicial Council. Service Fellows need not be members of the component county or constituent state or territorial associations or the American Medical Association and do not pay Fellowship dues. They do not receive any publication of the American Medical Association except by personal subscription. If a local medical society regulation permits, a Service Fellow may elect to become an active member of a component and constituent association and the American Medical Association, in which case he would pay the same membership dues as any other active member and receive a subscription to *The Journal of the American Medical Association*.

8. An active member of the American Medical Association may be excused from the payment of American Medical Association membership dues when it is deemed advisable by the Board of

Trustees, provided that he is excused from the payment of full dues by his component society and constituent association.

The following may be excused in accordance with this provision: (a) members for whom the payment of dues would constitute a financial hardship as determined by their local medical societies; (b) members in actual training for not more than five years after graduation from medical school, and (c) members who have retired from active practice.

9. Active members of the American Medical Association are not excused from the payment of American Medical Association membership dues by virtue of their classification by their local societies as "honorary" members or because they are excused from the payment of local and state dues. Active members may be excused from the payment of American Medical Association membership dues only under the provision described in Paragraph 8 above.

10. American Medical Association membership dues include subscription to *The Journal of the American Medical Association*. Active members of the Association who are excused from the payment of dues will not receive *The Journal* except by personal subscription at the regular subscription rate of \$15 a year.

11. Member Fellows may substitute one of the special journals published by the Association for *The Journal* to which they are entitled as members. A Fellow who substitutes a special journal will not also receive *The Journal*.

12. A member of the American Medical Association who joins the Association on or after July 1 will pay membership dues for that year of \$12.50 instead of the full \$25 membership dues.

13. An active member is delinquent if his dues are not paid by December 31 of the year for which dues are prescribed and shall forfeit his active membership in the American Medical Association if he fails to pay the delinquent dues within thirty days after the notice of his delinquency has been mailed by the Secretary of the American Medical Association to his last known address.

14. Members of the American Medical Association who have been dropped from the Membership Roll for nonpayment of annual dues cannot be reinstated until such indebtedness has been discharged.

15. The appointment of delegates from each constituent association shall be one delegate for each thousand, or fraction thereof, dues-paying active members of the American Medical Association as recorded in the office of the Secretary of the American Medical Association on December 1 of each year.

School Nutrition Program Recommendations

Recommendations to assist local school administrators in developing a nutrition program have been adopted by the State Joint Committee on School Health and approved by Mr. Roy E. Simpson, director, State Department of Education, and Dr. Wilton L. Halverson, director, State Department of Public Health.

Like other work of the committee, the statement on school nutrition represents the thinking of the two state departments. It is intended as a guide to local agencies, not an attempt to dictate local policies.

RECOMMENDATIONS ON SCHOOL NUTRITION

School food services can be justified only when they are considered in the light of the total educational program. The primary objective should be to provide pupils with a nutritious lunch, and to make the lunch program an integral part of the total educational program.

In order for the school lunch program to be most effective, the following recommendations are made:

1. The school lunch program is an important part of the total educational program and is, therefore, the responsibility of the school administration. Teachers, pupils, parents, custodians, and lunchroom supervisors and managers should share this responsibility.

2. The school lunch program should be closely correlated with a program of health, nutrition and social education.

3. Operation should be on a nonprofit basis with emphasis on wholesome food served as cheaply as possible in order to secure a high percentage of participation by children. Insofar as feasible and necessary, all costs legally permissible under the Education Code should be paid from tax funds.

4. Only those beverages which have health and nutritional value should be offered in elementary and high schools.

5. Such items as fruits, dried fruits, nuts, plain unsweetened popcorn and ice cream should be offered instead of candy.

6. Where morning and afternoon service is provided, it should be limited to fruit, milk, fruit juices, and should be scheduled so that it will not impair the pupil's appetite for his regular meals.

7. The dining area should be supervised by certificated personnel during the lunch period.

8. A nutritious lunch, priced as a unit, should be featured.

9. Special dishes provided for teachers should not be at the expense of an adequate lunch for the children, either in terms of a higher charge to children or at a reduction of food values.

10. Whenever possible, there should be a "food handlers" course offered to lunchroom personnel. In districts where there is a full-time local health department, the course may be provided by this department. In areas where there is no full-time local health department, the Bureau of Sanitary Engineering of the State Department of Public Health should be contacted.

11. Students who bring their lunches from home and students who purchase their lunches at school should be permitted to eat together.

12. In planning for food service facilities, administrators should give consideration to the educational aspects of the school lunch program.

13. Food sales in the schools by various organizations for fund-raising purposes often conflict with the total health program, and such sales should be discouraged.

More Vets Eligible for C. P. S.-VA Program

Action of the last Congress made veterans of the Spanish-American War, the Philippine Insurrection or the Boxer Rebellion eligible for out-patient medical care, at government expense, for any disability, without regard to its service connection.

By adoption of Public Law 791 by the last Congress, the estimated 11,000 such veterans living in California are brought within the scope of the California Physicians' Service-Veterans Administration Home Town Care Program and may receive treatment from C.P.S. physician members. These veterans may apply to any C.P.S. physician member for necessary medical care and the physicians, in turn, may request authority for treatment in the same manner as for treatment of veterans for service-connected disease or disability. The only condition on the veteran's eligibility is that he was discharged honorably.

All rules which apply to treatment of other veterans (awaiting approval of authorization, etc.) must be observed by both the veteran and the physician. However, both are assured that authority will be issued in every case where the discharge requirement is met.

Nursing Care for Veterans

Under a new VA ruling, any veteran entitled to out-patient services under the C.P.S.-VA Home Town Care Program is also entitled to necessary home nursing care. To obtain nursing services, physicians should make requests to the Chief Medical Officer at VA regional offices in San Francisco or Los Angeles, using VA Form 10-2868.

BOOK REVIEWS

PRIMER OF ALLERGY. By Warren T. Vaughan, M.S., M.D. Third Edition, revised by J. Harvey Black, M.D. C. V. Mosby Company, 1950.

The third edition of this book evidences a demand for information about allergy and its manifestations in patients. Dr. Black has not altered the delightful style and manner of writing of Dr. Warren Vaughan, whose thorough knowledge of every phase of allergy is evidenced in this text even though written for the nonmedical reader. Patients who read this book will gain important information about the causes of their allergic symptoms, the available diagnostic procedures, and the methods of control which are used by their physicians. They will appreciate the persistence of allergic reactivity and realize that relief requires their intelligent cooperation along with the persistent study and effort on the physician's part. As the "Primer" elucidates, excellent results from treatment can be expected in a considerable number of patients, good but not complete relief in a larger number, and failure in only a few patients who have cooperated in the advised manner.

Dr. Vaughan's emphasis on the importance of food allergy is of great importance and continues to counteract the nihilistic attitude of some allergists toward food allergy. His many publications on food allergy justify this emphasis. In stressing food allergy there is no detraction from the equally important inhalant allergy. The possible value of food diaries is in question. Time required to analyze these, which too often are inaccurate, might be better spent by instructing the patient in the accurate use of diet trial for adequate periods.

The complete reading of any text particularly on allergy reveals opinions and statements with which the reviewer disagrees. On page 61 the impression is gained that food allergy usually is indicated by positive reactions except in urticaria. Other students of allergy find that most manifestations of food allergy cannot be controlled by test-negative diets. On page 64 it is stated that specific allergic sensitizations tend to disappear with the lapse of time. Too often, however, this does not occur. The opinion rendered to the patient on page 75 rarely is so definite and final, particularly when skin reactions to inhalants and foods are the basis of such conclusions. These are a few of the questions raised in the reviewer's mind, but all are of minor significance compared with the available information, advice and help and encouragement contained in the volume.

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PARS PRO TOTO—Breviarium Medicum Internationale—Abbreviations in International Medical Literature including Sister Sciences. By Alfred Peyser. Stockholm, Almqvist & Wiksell, 1950.

One cannot recognize the value of such a book as "Pars Pro Toto" without executing the need for it.

Possibly without intent to do so, the first sentence in the preface damns the slothful and all too general use of dialectal abbreviations in scientific communications: "Abbreviations are so commonly used in medical literature that the reader is often obliged to consult voluminous . . . books of reference . . . for the explanation of their meaning." In other words, a language which ought to be catholic is often made provincial.

The book is intended, the preface concludes, to help the distressed reader find what might be meant by a quotation such as, "A lecture on PABA given by Mr. Brown, M.D., D.P.M., M.E.F., at a meeting of the Ufaw." To this end,

abbreviations used in medical and related literature in the principal languages of the world are listed alphabetically. Considering the vastness of the task, it is excusable that some abbreviations which (lamentably) appear to be standard in at least one small area of the globe are not listed. For instance, G.O.E. (for gas-oxygen-ether—what else?) is omitted. Perhaps the abbreviation is unknown in Sweden, where Pars Pro Toto was published—a possibility which should give pause to anesthesiologists who have something to say of value to an audience larger than the staff of one hospital. It is a little disturbing to provincial complacency, moreover, to note that mEq. (for milliequivalent) is so little known abroad that it is not even listed; the abbreviation given is m.equiv. As further illustration of the possibility for confusion through the use of abbreviation, the initials M.D. may mean, besides Medicinae Doctor, such a range of things and conditions as Manic Depression, Mental Deficiency, Mean Deviation, Medical Department, Maximaldosis, and, in the jargon of military medicine, Medicine and Duty (fit for duty).

The need for books of this kind probably will remain, despite the examples and instructions of Osler, Fowler, and Fishbein.

* * *

A TEXTBOOK OF X-RAY DIAGNOSIS. Second Edition. Volume III. By British Authors in Four Volumes. Edited by S. Cochrane Shanks, M.D., F.R.C.P., F.F.R., Director, X-Ray Diagnostic Department, University College Hospital, London; and Peter Kerley, M.D., F.R.C.P., F.F.R., D.M.R.E., Director, X-Ray Department, Westminster Hospital; Radiologist, Royal Chest Hospital, London. 830 pages with 694 illustrations. W. B. Saunders Company, Philadelphia, 1950. \$18.00. Vols. I and II to be published later.

This volume is divided into five parts which are as follows:

Part I, The Alimentary Tract, by Drs. Cochrane-Shanks, Johnstone and Teall.

Part II, The Biliary Tract, by Dr. Kerley.

Part III, The Abdomen, by Dr. Kent Harper.

Part IV, Obstetrics and Gynecology, by Dr. Rohan Williams.

Part V, The Urinary Tract, by Drs. Shanks and Johnstone.

The various aspects of diagnostic radiology of importance to students and those interested in standard textbook descriptions are ably outlined. There are several new illustrations, notably in the sections on obstetrics and the urinary tract. Unfortunately, as in the former editions, the illustrations are in positive, not negative form. This detracts considerably from the value of these well chosen figures. Your reviewer is well aware of the controversy regarding the ease of reproduction of roentgenograms and the fact that many distinguished journals use the positive form. Nevertheless, he believes that the negative form has superior teaching value and is certainly easier for most physicians to correlate with the roentgenograms of the patient one is studying.

There are a few sections of the text which might be clarified. The editorial board might call for a majority vote on improved classification of hiatus hernias. The terminology "hypersthenic" and "hyposthenic" gallbladder seems a little out of date considering the very fluid nature of the shape and appearance of this viscus in the living person.

Considering the enormously broad nature of the field covered, we must continue to recommend this book to students and practitioners.

A TEXTBOOK OF X-RAY DIAGNOSIS. Vol. IV. By British Authors in Four Volumes. Edited by S. Cochrane Shanks, M.D., F.R.C.P., F.F.R., Director, X-Ray Diagnostic Department, University College Hospital, London, and Peter Kerley, M.D., F.R.C.P., F.F.R., D.M.R.E., Director, X-Ray Department, Westminster Hospital; Radiologist, Royal Chest Hospital, London; 533 Illustrations; W. B. Saunders Company, Philadelphia, 1950. \$15.00. (Vols. I and II to be published later.)

This volume is devoted entirely to disorders of bones and joints.

Most of the chapters are similar to those of the first edition, with minor revisions. However, there has been complete revision of the chapter on traumatic lesions of bones and joints, and the chapter on tumors and cysts. There are 150 more pages than in the previous edition and 230 more illustrations, 130 of these being in the chapter on traumatic lesions.

The total number of authors is 17, there being three additions to the previous group, and one deletion (one of the senior editors, Dr. Twining, having died).

The volume deals with normal bones and joints, general pathology of bone, congenital deformities, traumatic lesions, inflammatory diseases, static and paralytic lesions, constitutional diseases, and tumors and cysts of bone. There is a section on intervertebral disc lesions, on lesions of soft tissues and on localization of foreign bodies.

The viewpoint expressed is that of British radiology, notably of men in the London and Manchester areas. The text is clear. Most of the illustrations are good, but unfortunately are in negative instead of positive form.

Some readers will regard the format as "new and gay compared to a rather gloomy wartime format" of the previous edition. This particular reviewer admits a preference for the former style.

The bibliography has been enlarged. The work can be recommended for use by orthopedists, radiologists, and the shelves of most medical libraries.

* * *

PSYCHIATRIC SECTIONS IN GENERAL HOSPITALS
—An Architectural Record Book. By Paul Haun, M.D., Med.Sc.D., Assistant Professor of Psychiatry, Georgetown University Medical School. F. W. Dodge Corporation. Published by Architectural Record, 119 West 40th Street, New York 18, N. Y., 1950. \$4.00.

In these days when large numbers of new general hospitals are being planned or being built, it is unforgiveable not to consider the incorporation of psychiatric units into such construction. Communities that are acutely aware of the need for hospital facilities for medical and surgical beds frequently ignore an equally pressing need for psychiatric beds unless individuals in these communities have been presented with such problems when close members of their families develop mental illness. There is no need to re-emphasize the importance of and pressing necessity for more psychiatric beds when it is known that over 51 per cent of beneficiaries in the Veterans Administration are receiving hospital treatment for mental illness. If psychiatric hospital facilities were available in general hospitals of smaller communities, more psychiatrists would be attracted to such areas. Such psychiatric units would emphasize the treatment of illness of short duration and good prognosis, and leave to larger psychiatric hospitals continued treatment problems. An additional advantage to the medical staff would be an increasing cooperation and integration of medical discipline, and would bring psychiatrists, internists, and surgeons into closer liaison with one another.

The author presents excellent arguments for a truly "general hospital" which contains a psychiatric unit in satisfying community needs, improved patient care, improvement of patient morale, opportunities for research, and economy of operation. He follows a patient from the moment

of his admission, through the period of interview and examination, diagnosis and treatment, to his discharge, and he analyzes in detail the facilities necessary for the patient's care both from the administrative and professional standpoint. Eight different plans for psychiatric floors in general hospitals are presented, rated variously from excellent to unsatisfactory, and analyzed as to desirable and undesirable aspects. To these Butler and Erdman, hospital architects, have added a chapter on their ideas of an ideal psychiatric service of 24 beds on the sixth floor of a general hospital.

This little volume is an excellent and practical one; it is organized and presented in such a way as to indicate specific ways and means of integrating a psychiatric unit into a general hospital.

* * *

HAIRFREE—The Story of Electrolysis. By Samuel Simon, 1370 Washington Ave., Miami Beach, Florida, 1948.

This 100-page booklet is valuable information mainly for patients who suffer from the problem of superfluous hair and also for prospective students of electrolysis. It is too elementary for general physicians, dermatologists or experienced electrologists.

* * *

CORONARY CIRCULATION IN HEALTH AND DISEASE. By Donald E. Gregg, M.S., Ph.D., M.D., Chief Research Physician, Medical Department, Field Research Laboratory, Fort Knox, Kentucky. Lea and Febiger, Philadelphia, 1950. \$4.50.

It is most encouraging to find in a book of this sort the simple, straightforward attack on the stated problem, as presented by the author. In spite of his years of experience in the field of coronary circulation he has not lost sight of the one problem which is undoubtedly the cause of much of the divergence of opinion among investigators in cardiovascular diseases. Dr. Gregg devotes a great deal of time in impressing upon the reader the progress made in the study of the "intact" heart. Many comparisons are made of the various types of investigations carried on. He clearly shows the difference in results obtained by working on the open-chest dog and the closed-chest, anesthetized dog. It is here that the reader sees the shortcomings of such work and the author attempts to evaluate it, always keeping in mind the experimental handicaps.

The treatment of manometers used in recording pulsatile cardiac pressures is a very difficult task and is handled very adeptly. By a straightforward evaluation of the problem of recording pressure pulses, the pros and cons of various types of recording manometers can be seen. In this manner the reader can practically determine for himself which type of manometer is best suited for his problem. Certainly more than a superficial knowledge of these instruments is evident from the thorough treatment given them. Similarly, his presentation of the pressure curves obtained in his experiments shows a great deal of experience and is the product of a great deal of thought and analysis of the various curves. Although no final judgment is passed, the controversies over the "normal" pressure curves are developed in detail. These are accompanied by the basic hydrodynamic considerations of the pressure pulse and supply the reader with sufficient information to evaluate these curves for himself.

Complete, accurate and basic descriptions are given of the various tools available for the study of coronary flow. Their complete development is given and perhaps the only thing lacking in each instance is a critical analysis of these various instruments. After the many years of experience with these problems that Dr. Gregg has had, it doesn't seem out of order to ask for his personal observations and criticisms on points that even today are causing so much controversy. However, the very thorough manner in which Dr. Gregg handles each one of these problems enables the reader,

with his better understanding of them, to look at them more intelligently and come to his own conclusions.

Clinical coronary disease is, as might be expected, not covered in this book, but two excellent chapters, one on the statement of the problem and the other on the coronary circulation in heart disease and cardiac failure, should be of particular interest to the clinician.

Gregg's book can be highly recommended to all physicians who would like a critical discussion of experimental approaches to the study of the coronary circulation.

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A HISTOLOGY OF THE BODY TISSUES—With a Consideration of Their Functions. By Margaret Gillison, Diplomae of Bedford Physical Training College, Member of the Chartered Society of Physiotherapy. The Williams and Wilkins Company, Baltimore, 1950. \$3.50.

Miss Gillison has attempted to bridge the gap between elementary texts of anatomy and physiology and those dealing exclusively with histology, to meet the needs of students of physiotherapy and physical education.

After a brief but comprehensive introduction during which she outlines the structure, physiology and differentiation of cells, there is a helpful resume of histologic methods. Fixation, cutting, staining and mounting of tissues are briefly explained. The next two chapters on connective tissue, cartilage and bone are well written and beautifully illustrated. The author might profitably have briefly outlined the part these tissues play in repair, keeping in mind the avowed purpose of the text.

The chapter on blood and tissue fluids contains a great deal of information, particularly dealing with metabolic processes, condensed into a few pages. The statement (page 113) that the cerebrospinal fluid "receives the secretion of the pituitary gland" is regrettable and should be deleted from future printings. The author discusses blood clotting and hemostasis but overlooks the importance of contraction of the severed blood vessel, a major factor.

The scope of the book is necessarily restricted, however. Miss Gillison has emasculated her text by omitting most of the male reproductive tract: the prostate, seminal vesicles, urethra and penis. Other unfortunate omissions include the eye, ear, dental structures and thymus.

The book is well bound and of convenient small size. The print is clear, the paper of good quality. All illustrations are drawings, meticulous in detail, simple and well chosen.

The book is recommended to those for whom it is written, as it fills a definite need.

* * *

AN ATLAS OF HUMAN ANATOMY. By Barry J. Anson, Ph.D., Professor of Anatomy, Northwestern University Medical School. W. B. Saunders Company, Philadelphia, 1950. \$11.50.

The preparation of an atlas of human anatomy is a considerable undertaking. It requires an inordinate amount of time and patience, many hours of dissection, the close co-operation of author and artist, and, above all, a clearly defined plan. In general, two methods have usually been adopted, the systematic and the regional. Both have their advantages and disadvantages. The systematic lends itself to greater clarity and ease of presentation, but fails to some extent in developing the relations of the various systems to one another. The regional is the superior in the latter regard, but is often confusing in that an excess of detail muddies the execution. Most authors have, therefore, sought a compromise between the two methods.

In the present atlas, the author, Barry J. Anson, professor of anatomy at Northwestern University Medical School, has adopted a compromise in which the material is arranged in regional sections, such as the head, the neck, upper extremity, abdomen, etc., and in each section the arrangement is

largely systematic; the bones, joints, muscles, vessels and nerves being taken up in that order. Furthermore, it is the author's stated aim "to prepare an atlas of gross anatomy whose pictorial content would be based upon new dissections, serially prepared, and upon variable morphological features statistically presented." In carrying out these aims, the drawings of the dissections are to be accurately prepared and "neither warped to conform to preconceived, stereotyped concepts of human morphology, nor simplified to serve as transitory chartings for a laboratory excursion." It is the further purpose to present, with few exceptions, only those features of human structure which are demonstrable in the regular study of the cadaver. In addition, the atlas was prepared so as to be useful to both the beginner and the physician who "require a reference book based, not upon perennially copied figures, but upon the artists' unbiased portrayal of dissection."

These are all very laudable aims, but the question at hand is to what extent they have led to the production of a useful and well balanced atlas of human anatomy. But, first of all, a word as to the drawings themselves, since in any atlas much depends upon the artist's skill. Several artists have participated, Mary Dixon Elder, Tom Jones, Willard C. Shepard, Lucille Cassell Innes and Jean McConnell, so that what is lost by unevenness is gained by variation in style. The media consist of half-tone and line, with the occasional use of a little color. By and large, the execution and reproduction of the drawings is good. Some are excellent but some are a little flat and, at times, line has been chosen where half-tone would have had greater advantages. Throughout, the influence of the school of Max Brödel, the late dean of American illustrators, is very evident. It is unfortunate that full color is no longer feasible owing to high costs, since it does much to relieve the monotony of black and white. It is a sad commentary on our times that color is only possible in the advertisements of the pharmaceutical houses and denied to real scientific endeavor and instruction.

However, despite the efforts of the artists, and apart from individual illustrations, the reviewer has found the atlas as a whole disappointing. It would appear that the atlas had not been conceived initially in its entirety and, therefore, gives the impression of a collection of drawings with little relation between them. It is extremely difficult to review a single region in continuity, and stylistic differences enhance this difficulty. The necessity of a transition from the systematic to a regional presentation has been ignored. There is a lack of balance and proportion throughout the work. In part, this is due to the attempt to present morphological variations. A knowledge of variation in certain regions is extremely important especially to the surgeon. No one would deny the necessity of portraying the differing arrangements of the vessels in the hepatic pedicle, but what is to be gained from a knowledge of the six types, two hypothetical, of the relationship of the sciatic nerve to the piriformis muscle, of the variations in insertion of the plantaris tendon, of the nineteen drawings of variations of the extensor tendons of the hand, of the ulnar slip to the flexor pollicis longus, to mention a few examples at random; whereas, one may look in vain for an adequate treatment of the important ligaments or bursae of the knee joint. Surely, such information on variations is better confined to the periodical literature where it is available in greater detail to the interested student or, in view of Doctor Anson's great contribution in the field of anatomical variation, the development of a monograph on the subject. Are the anatomist and physician more interested in the anatomy of the living or of the dead? Would they prefer information on the positions of abdominal viscera obtained from the 425 cadavers with percentage variations as illustrated on p. 286, or that obtained from radiological examination of the living? It is indeed strange to

see a modern atlas without a single roentgenogram. Although the author has placed limitations on what he will present in the way of embryological information, we find some illustrations on the development of the heart, but nothing on the fetal circulation, despite the enormous importance of the latter in relationship to congenital lesions of the infant.

These imperfections, and they are numerous, are undoubtedly due to the author's specious reasoning that he is presenting an "unbiased portrayal of dissection." If this is the aim, why not employ photography, since the work of every artist reflects not reality, but his interpretation of reality. To use the artist to advantage is to recognize this fact and to employ his talents for the creation of clarity of expression which the camera cannot yield. It is a sort of scientific snobbery to claim faithfulness of drawing and to feel that an illustration which is interpretative has no place. In fact, generalization is one of the aims of science and has given us our Darwins, and so, the abstract figure representing average conditions is not to be condemned out of hand as "stereotyped," but rather as a measuring rod from which deviations may be assessed. Secondly, the reviewer's sense of disappointment stems from a feeling that the approach of this atlas is too academic and does not fill the requirements of the intended audience, or should one say, spectator.

Despite the unfavorable opinions expressed above, there is much to be commended in Doctor Anson's atlas. As has been mentioned, many of the drawings are excellent and have great instructional value. For example, the series on the female pelvis and its contents have unity and should prove of great value to both medical student and practicing physician. There is a wealth of information on variation which is not to be found elsewhere. In all, keeping in mind the limitations mentioned above, student and physician will find something of profit in Anson's *Atlas of Human Anatomy*.

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AN INTEGRATED PRACTICE OF MEDICINE—PROGRESS VOLUME (Vol. V). Modern Developments in Therapeutics and Methods of Treatment to accompany 4-volume Integrated Practice of Medicine. Contains cross reference to the original 4 volumes and an index system to all 5 volumes. W. B. Saunders Company, Philadelphia, 1950. 734 pages. \$10.00.

This Progress Volume brings up to date Hyman's Integrated Practice of Medicine. The new material is concerned chiefly with recently devised therapeutic measures and suggestions for specific management of the individual patient. Like the rest of the series, this volume provides a great deal of well-coordinated, easy-to-find information, flavored strongly with Dr. Hyman.

The style of the book is somewhat unusual and may halt the reader until he is accustomed to it: The subject matter is arranged alphabetically without regard for other classification. This results in a conglomeration of discussions on diseases, remedies and laboratory procedures. For example—to choose at random—one finds on pages 4379 and the following these successive headings: Isonorin Sulfate N.N.R., Isopenatquine Oxalate, Jaundice, Klebsielllosis, Koch-Weeks Conjunctivitis, Laboratory Procedures Simplified, Lambliasis.

Certain errors should be pointed out. On page 4194, androgens are recommended for the prevention and treatment of the orchitis of mumps. Fortunately the cross-reference on page 4418 (if the reader jumps over there) advocates stilbestrol for the male and testosterone for the female. On page 4634 virus dysentery is passed over as a disease which "requires only symptomatic therapy" (regardless of the fact that it may cause death in infants). And the public health experience of the past 20 years with the rising incidence of diphtheria, especially in adults, makes one wonder at the brash optimism of such a statement as "With compulsory immunization, diphtheria can be elimi-

nated. Effective artificial active immunization can be induced by injection of diphtheria toxoid" (page 4302).

Of the 734 pages, 165 are given over to a relisting of the general index of volumes 1 to 4. Inasmuch as a separate index volume containing the same information has previously been published the reviewer can see little reason to include this in the present volume.

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SEXUAL FEAR. By Edwin W. Hirsch, B.S., M.D., Attending Urologist, Englewood Hospital, Chicago, Illinois, Garden City Publishing Co., Inc., Garden City, N.Y., 1950. \$3.00.

This is a strange book. It is written by a genito-urinary specialist who has concerned himself with the psychology as well as the mechanics and hydraulics of the generative system. His main thesis appears to be that man, and woman, have fallen upon evil days because of "sexual fear." The first part of the volume is devoted to an account of what purports to be the origin of these fears, taking the reader over the whole period of recorded history in relation to sexual customs. This is fairly interesting and, in fact, rather racy reading, but leaves the reader with the feeling that its mission has failed of accomplishment.

In the remainder of the book, there are numerous portions dealing with impotence in the male and frigidity in the female which demonstrate the practical good sense of the author, and which can be read to advantage. It is rather doubtful, however, if the lay reader would be able to winnow the wheat from the chaff, and for this reason I do not believe that the book would be helpful to the patient with sexual problems, to whom it is apparently directed. For the physician, there are probably better and less dilute sources of information.

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HOUSE STAFF MANUAL—LOS ANGELES COUNTY HOSPITAL. By David Hamm, Jr., M.D., Editor-in-Chief; Raymond D. Goodman, M.D., Ernest T. Smith, M.D., and Robert H. Van Scoyoc, M.D., Assistant Editors. Sixth Edition. Los Angeles County Hospital Staff, 1950. \$4.12.

Interns who have faced with each change of service, a welter of new routines, technical procedures, and diagnostic responsibilities, will understand the need for this type of outlined information. The seventy-odd contributors, all members of the attending, house, and resident staff of the Los Angeles County Hospital, also realize that for this purpose a concise, didactic guide, whatever its errors of omission and commission, is superior to a more pedagogically satisfying monograph. From this point of view the book is a success, and criticism of proofreading and individual opinion is pointless.

The subject matter is so arranged that it is readily available. Essential details and clinical "pearls" are intermixed in outline-form. Sections deal with General Medicine (e.g., anticoagulant therapy, body fluid and electrolyte problems, hypertensive heart disease), Pediatrics, Psychiatry, Neuro-medicine, Neurosurgery, General Surgery, Anesthesia, Urology, Orthopedics, Gynecology, Obstetrics, Dermatology and Syphilology, Ophthalmology, Otolaryngology, and laboratory procedures. Useful smaller sections are presented, such as those on Physical Medicine, Radiation Therapy, Medico-Legal problems. A Spanish vocabulary is added for good measure.

Of the numerous house-staff manuals, this is one of the best and possibly the largest (can medical knowledge be compressed to fit the intern's largest pocket?). If the volume is accepted as an outline of standard procedure at one institution, it should prove most valuable to the detail-minded house officer and practicing physician.

RICHTLINIEN EINER PHILOSOPHIE DER MEDIZIN.
By A. W. Kneucker, M.D., Riverside, California, Verlag
Wilhelm Maudrich, Wien, 1949. \$4.50.

This book, published by Wilhelm Maudrich, Vienna, and written by Professor A. W. Kneucker, in Riverside, is mainly a philosophical dissertation on subjects related to medicine and in the field of medicine. Although interesting to the author and a certain small group in the medical profession, it probably would not be of any interest to the general practitioner both because of the content and the fact that it is written in German.

* * *

EMERGENCIES IN MEDICAL PRACTICE. Edited by C. Allan Birch, M.D., F.R.C.P., Physician Chase Farm Hospital, Enfield. With 181 illustrations, 8 in full color. 564 pages. Second Edition. The Williams and Wilkins Company, Baltimore, 1950. \$5.50.

This is a book designed primarily for the general practitioner and includes in its scope emergencies in all branches of medicine occurring not only on land but on the sea and in the air. The appearance of a new edition of this book within less than a year bespeaks its popularity among the practitioners in Great Britain. The book represents the combined efforts of numerous collaborators who have covered their subjects well. As can be expected there is some overlapping. Beside the ordinary medical and surgical emergencies all sorts of emergencies are discussed such as how to remove a fixed wedding ring. Just why discussion of this subject should be sandwiched in between foreign bodies and acute gout is not quite clear to the reviewer. A 30-page discussion of medical proceedings of various sorts such as lumbar punctures, thoracentesis, etc., would appear useful to the beginner in practice, especially in a country where internship training is not universal. One might disagree with some things in the book such as a statement that the acute abdomen of diabetic acidosis is "probably due to distention of the liver by fat." The strong improvement in seasickness therapy effected by the induction of dramamine did not appear at all clear cut to the author who rates its effect no higher than the old-time methods of treatment. The reviewer was interested by the method of treatment of mushroom poisoning consisting of the oral consumption of uncooked rabbit's brain and rabbit's stomach over a period of days.

In England the metric system has made small inroads on the apothecary system. One is sorry again that Napoleon did not get to England to replace, as he did in the rest of Europe, the outmoded system of apothecary measurement by the metric standard.

Making allowances for differences in practice in Great Britain and the United States the book should prove to be particularly useful to the young general practitioner in the Western Hemisphere.

* * *

NOSES. By Harold M. Holden, M.D. An exhaustive work on the Nose in Psychology, Literature, Art, Plastic Surgery, Folklore and Anthropology. Illustrated. 252 pages. The World Publishing Co., Cleveland, 1950. \$3.50.

Doctor Holden has written an interesting and entertaining book of popular appeal, comprising the folklore concerning the nose and the part this feature plays in human history and human relationships. It is apparent that Doctor Holden has been collecting choice quotations regarding noses from his reading over a period of years, and this material forms the illustrative data of his book. Fortunately he has not burdened it with the pedantry of physical anthropology; however he does give the elements of the study of physiognomy in a concise form. The book is recommended for those who wish to acquaint themselves with some of the concepts which have made plastic surgery the craft it is.

FACIAL PARALYSIS. By J. Parkes Findlay, M.B., Ch.M., Honorary Assistant Aural Surgeon, Sydney Hospital. Published by the Author and Distributed by Angus and Robertson, Ltd., 89 Castlereagh St., Sydney. 17/6. 1950.

This small book of 45 pages on facial paralysis, being a treatise on clinical classification of paralysis of facial nerve, is published by the author. There does not seem to be much new in this book, either in the differential diagnosis or treatment, except that the author advocates decompression of the nerve in facial palsy due to what he terms vascular occlusion or due to trauma, but those due to various infections such as disease of the geniculate ganglion, facial weakness and neuritic facial weakness recover without any difficulty. He feels that the symptoms of palsy due to vascular occlusion are severe pain, sharply localized behind the ear and which may be present one to three days before the development of paralysis.

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THE PATHOLOGY OF INTERNAL DISEASES. By William Boyd, M.D., Dipl. Psych., M.R.C.P. (Edin.) Professor of Pathology and Bacteriology in the University of Toronto. Fifth Edition, thoroughly revised, with 391 illustrations and 11 colored plates. Lea and Febiger, Philadelphia, 1950. \$11.00.

This new edition of Dr. Boyd's well-known book maintains the writer's readable style. A considerable effort has been made to add essential new material to bring the book up to date. Among the new presentations sections on pulmonary fibrosis, adrenal cortical relationships, arteritis and related diseases, and bone and joint pathology are worth special mention. There are three new color plates and a number of new black-and-white illustrations.

The book represents an effort to discuss disease in terms of tissue changes, and it should be an aid to practitioners seeking to explain clinical manifestations of disease.

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STEROID HORMONES AND TUMORS. Tumorigenic and Antitumorigenic Actions of Steroid Hormones and the Steroid Homeostasis, Experimental Aspects. By Alexander Lipschutz, M.D., Director of the Department of Experimental Medicine, National Health Service of Chile. Formerly Professor of Physiology; The Williams & Wilkins Company; Baltimore; 1950. \$6.00.

This book of 309 pages is a very complete presentation of the author's own work on the production of growth responses in animals by estrogenic substances. Considerably less than half of the book relates to the work of other laboratories with respect to steroid hormones and tumor growth. The book contains an exhaustive discussion of available knowledge concerning the production and inhibition of fibrous tumors in the female pelvic organs and elsewhere in the guinea pig by the use of estrogens, and based largely upon this work the author's philosophy of the nature of tumors is presented. The concept of endocrine imbalance is used freely in the discussion of pathogenesis of abnormal growth responses to steroid hormones, and considerable emphasis is placed upon the finding that tumor-like proliferations in animals occur much less prominently when estrogenic agents are administered intermittently than when there is continuous administration of these substances.

The book is adequately illustrated. It is somewhat difficult to read because of the frequent use of unusual terms such as "tumoral seed," "the mosaic of territories," "desensibilization," "conjunctive membrane," but most of these terms are clarified in the text. There are a number of minor typographical errors and ungrammatical expressions but these do not destroy the meaning of the affected passages.

The author does not intend that his book should be used to direct the use of steroid hormones in clinical medicine, but rather that it should serve as a source of information for students of cancer and the manifestations of steroid hormone administration.

AMUSING QUOTATIONS FOR DOCTORS AND PATIENTS. Edited by Noah D. Fabricant, M.D. Grune and Stratton, Inc., New York, 1950. \$3.00.

This amusing book, with short quotations, one to five lines long, seems to be enjoyable by patients and doctors alike, especially if they are in the hospital. There is nothing profound about the book nor does it contain any illustrations, yet it should bring a chuckle every now and then.

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THE OTHER SIDE OF THE BOTTLE. By Dwight Anderson. A. A. Wyn, Inc., New York, 1950. \$3.00.

This account by an ex-alcoholic is intended for the alcoholic and those interested in his care. It can, however, be read to advantage by the physician, to whose lot frequently falls the unhappy task of prescribing treatment for this condition. It outlines the facilities at present available for the treatment of alcoholism, and describes the agencies interested in the problem.

The author recounts, with relish, case histories from his own experience and that of others. He has no special plea for any form of therapy, but presents them all in an impartial manner. One gets the impression that, in spite of relating his own cure to the efforts of a psychiatrist, he evaluates the effect of faith, and such agencies as Alcoholics Anonymous, rather more favorably. In this the reviewer must agree with him.

It is doubtful if the book would be of great value to the alcoholic. It is, however, profitable reading for those responsible for the care of an alcoholic, and this includes family, friends, and physician.

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WILLIAM WITHERING OF BIRMINGHAM, M.D., F.R.S., F.L.S. By T. Whitmore Peck, M.P.S., and K. Douglas Wilkinson, O.B.E., M.D., F.R.C.P. The Williams and Wilkins Co., 1950. \$4.50.

According to the preface, this splendid little book was written by Professor K. Douglas Wilkinson, successor to William Withering as an Honorary Physician at the General Hospital, Birmingham. This is clearly a labor of love by one well versed in the life and times of a very great figure in British medicine.

In these days of standardized medical and pre-medical education, one point bears emphasis. Withering, among other accomplishments, was a botanist; his "Botanical Arrangement of all the Vegetables naturally growing in Great Britain" (1776) was the first comprehensive English work based on the botanical system devised by Linnaeus forty years earlier. The famous and secret "family receipt" concerning which his opinion was asked in 1775 "was composed of twenty or more different herbs; but it was not very difficult for one conversant in these subjects to perceive, that the active herb could be no other than the Foxglove." This was clearly no accidental discovery, but the work of a prepared mind, that caused the studies which produced "An Account of the Foxglove" in 1785.

The biography further tells of Withering's lucrative practice, his studies in scarlet fever and ability as a clinician, his disputes with the grandfather of Charles Darwin, his interests in chemistry and mineralogy, and membership (together with such men as James Watt, Josiah Wedgwood and the Galtons) in the Birmingham Lunar Society, a group meeting at each full moon in order to discuss topics of literature, art, and science. Birmingham itself is described interestingly. After a discussion of Withering's fatal illness (he died at 58 of tuberculosis) the book closes with appendices devoted to genealogy.

Attractively published, the volume is well illustrated and contains many letters written by Withering. It is recommended highly.

HEARING TESTS AND HEARING INSTRUMENTS. By Leland A. Watson and Thomas Tolan, M.D., The Williams and Wilkins Company, Baltimore, Md., 1949. \$7.00.

There is real need for a book that assembles in one place the latest information on the subjects of this title. It is unfortunate that this, the only one available, so strongly features the products of one manufacturer. There are adequate discussions of audiometric technique and interpretation, the "recruitment" phenomenon, speech hearing tests and the Social Adequacy Index. The optimum characteristics to be aimed for in the design of hearing aids as recommended in the Harvard-Davis report are mentioned. There is much that is fairly complex and "scientific" and also much that suggests a sales pamphlet for the hard of hearing layman. Nevertheless, there is a place for this volume in every otologist's library. The index is satisfactory, but the reviewer can see little merit in the system invented for reference to the extensive bibliography.

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SEROLOGY WITH LIPID ANTIGEN — With Special Reference to Kahn and Universal Reactions. By Reuben L. Kahn, M.S., D.Sc., Associate Professor in Department of Dermatology and Syphilology, University of Michigan Medical School. The Williams and Wilkins Company, Baltimore, 1950. \$6.00.

This book approaches the question of the serologic tests from an unusual and interesting point of view. Positive reactions between blood serum and lipid antigens are shown to occur in normal individuals and only under carefully regulated conditions do they become diagnostic of syphilis.

The first and last sections of the book are devoted to a discussion of the "Universal Serologic Reaction." The procedure to which this term is applied was devised by Kahn and consists of a series of quantitative Kahn tests set up in ten different concentrations of sodium chloride from 0 to 2.1 per cent and with serum dilutions ranging from 1 to 640. The results are read immediately and after 4 and 24 hours of ice box incubation.

In the lower and higher salt concentrations, some flocculation always occurs, particularly at the 4- and 24-hour readings. The standard quantitative Kahn test with 0.9 per cent saline is near the middle of the battery of tests and is usually completely negative in normal people. However, there is a considerable degree of variation, and some normals show precipitation zones that approach very close to the 0.9 per cent column, from either the low or the high salt concentrations, and a few actually reach it. These, of course, would give biologic false positive reactions in the standard Kahn test for syphilis.

There are some differences in the patterns of flocculation in the Universal reaction that may help to differentiate between syphilis and yaws. In leprosy, flocculation occurs in all salt concentrations but the pattern is different from that seen in syphilis. In tuberculosis and malaria flocculation occurs in a manner that Kahn thinks is distinctive enough to be of value in diagnosis or the estimation of activity. However, some of the examples presented resemble some of the normals so closely that the usefulness of the Universal reaction in these diseases is dubious.

The technique of the Kahn test and its application in the diagnosis of syphilis are discussed in detail. The importance of keeping any test that is used in clinical diagnosis, insensitive enough to avoid false positives, even at the expense of a considerable loss of sensitivity, is emphasized.

It is refreshing to read a book on serology written by a serologist who is so thoroughly aware of the non-specificity of the lipid antigen tests and who appreciates the great injury that is done to people in whom an erroneous diagnosis of syphilis is made because of a false positive reaction.

MEDICAL JURISPRUDENCE

Physicians — *Res Ipsa Loquitur* — Brief History Application in General

PEART, BARATY & HASSARD OF THE CALIFORNIA BAR

Some mention has been made in past articles of the doctrine of *res ipsa loquitur* (the thing speaks for itself), but it might be well, at this time, to explain what the doctrine is with its various ramifications and how it is applied to the practice of medicine.

The doctrine is not restricted to the medical field but is applied to all negligence cases. The doctrine was expounded in several early English cases, one of the leading ones being a case in 1863. The plaintiff, while walking on a public street, was injured when a barrel of flour fell upon him from a window above. The court held that the doctrine was applicable.¹

However, as applied to the medical field it is only in recent years that the doctrine has gained prominence. From the fall of the barrel of flour the doctrine has worked its way into the operating room and other fields of the medical profession.

In a given fact situation, the following elements are necessary in order to have the doctrine apply:

a. The thing that causes injury must be under the management and control of the defendant (the barrel of flour was under the management and control of defendant);

b. The accident must be of a type that does not ordinarily happen without negligence (a barrel of flour usually doesn't fall out of upper story windows);

c. It must not be due to any voluntary action or contribution on the part of the plaintiff (plaintiff in the flour case was merely walking along the street).

What is the legal effect of the doctrine? If the doctrine can be applied to a specific set of facts, it establishes what is known in the law as "a *prima facie* case." This does not mean that the defendant is absolutely liable but that the burden is cast upon the defendant to explain how the injury occurred and if he fails to show that it was not caused by his negligence, it must be accepted as an established fact that the injury was due to a want of proper care upon his part. This will subject him to liability for negligence without any further evidence being introduced. It relieves the plaintiff of the burden of showing what specific act of negligence caused the accident as is required in an ordinary negligence case where the doctrine cannot be applied.

The reason for the rule is that ordinarily the one injured is not in a position to know more than that he was injured by some unusual movement of the instrumentality, whereas the one who operates the instrumentality should be in a better position to know and to explain the precise cause of the accident. Along the same lines, the Supreme Court of

California in a 1945 case said when applying the doctrine to a case involving a physician: "Without the aid of the doctrine, a patient who received . . . injuries . . . obviously the result of someone's negligence, would be entirely unable to recover unless the doctors and nurses in attendance voluntarily chose to disclose the identity of the negligent person and the facts establishing liability."²

The California courts have in a number of malpractice cases applied the doctrine so that in a particular fact situation there is a presumption of negligence raised and it is up to the physician or surgeon to show that he exercised due care. For instance, where a sponge is left in the incision, it has been held that the burden was upon the doctor to show that it was not a result of negligence.³ Likewise where a child was placed under an anesthetic preparatory to an operation for the removal of tonsils, and for no apparent reason the bone in the superior maxillary was fractured in front and a tooth pulled or forced from the socket, it was held that the doctrine applied.⁴ In a 1937 case the District Court of Appeals of California held that the doctrine was applicable where plaintiff was burned while under the influence of opiates.⁵

The Supreme Court of California, in a 1945 case, held that the doctrine applies where a patient while unconscious on an operating table receives injuries to a healthy part of his body not subject to treatment or within the area covered by the operation from instrumentalities used in his treatment.²

The doctrine has also been applied in connection with certain x-ray cases. Thus it has been said that where a dangerous instrumentality is in the possession of a party, the proper and skillful use of which would result in no injury, and where an injury follows the use of the same, negligence on the part of the person having charge thereof may be inferred.⁷

From the above cases, it may be observed that the doctrine of *res ipsa loquitur* has progressed considerably from the barrel of flour case to modern day application. It is uncertain as to the extent the doctrine may be invoked in cases of injury from medical treatment—an uncertainty which has been intimated by the courts. However, for physicians and surgeons it certainly is a doctrine worthy of notice.

REFERENCES

1. Byrne v. Boadle (1863) 2 H&C 721.
2. Ybarra v. Spangard, 25 C (2nd) 486.
3. Key v. Caldwell, 39 CA (2nd) 698.
4. Brown v. Shortridge, 98 CA 352.
5. McCullough v. Langer, 23 CA (2nd) 510.
6. Ragin v. Zimmerman, 206 C 723.